COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper | Second-class postage paid at Boston, Mass., and additional mailing offices | © 1975 by Computerworld, Inc

Price $12/year | September 24, 1975 | Vol. IX, No. 39

NEWSPAPER

Looks at DBMS

Survey Shows Users Pleased With Systems

By Don Leavitt
Of the CW Staff

Current users of all the more popular data base management systems (DBMS) are generally happy, but users of DBMS from independent software houses tend to like their systems better than users of IBM's IMS like theirs.

Those conclusions were drawn from responses to a questionnaire run on *Computerworld*'s editorial page last month (CW, Aug. 27). Though based on data gathered separately, they confirmed conclusions of a Datapro Research Corp. survey published last October.

CW's survey asked two questions with quantifiable answers: "How would you rate the capabilities of your DBMS?" and "How would you rate vendor support?" CW provided four possible answers to each, ranging from "excellent" to "needs improvement."

Weighting responses on a four-point scale (with "excellent" valued at 4, and "needs improvement" valued at 1), Adabas from Software AG came up with the highest weighted averages. Fifteen Adabas users responded and graded their package capabilities at 3.73 and vendor support at 3.25.

System 2000 from MRI Systems Corp. garnered the next highest weighted average scores. Package capabilities were deemed better than good, at 3.27, and vendor support came in with an even higher score, 3.48.

'Total' Popularity

Cincom System's Total showed its popularity – industry estimates have pegged its installed user base at close to or larger than IBM's IMS base – with responses received from 66 users. Their combined opinion was that the package was worth 3.24 on the four-point scale, but vendor support shipped below the 3.0 of "good" to 2.76.

"Ballots" were received from another 66 users working with IBM data base systems – various versions of IMS, including the DL/I subset. Overall, they saw the software as worth 2.97 and vendor support worth 2.63.

Only five users of IDMS from Cullinane Corp. reported their evaluations – which were all in the "good" or "excellent" area – so weighted averages were not calculated for that DBMS. In similar fashion,

(Continued on Page 2)

CW Special Report On Data Base Management Systems Follows Page 28

In Measuring Performance

Three Users Find SMF Inadequate

By Don Leavitt
Of the CW Staff

FORT LEE, N.J. – IBM's System Management Facilities (SMF) is inadequate as a performance measurement tool, according to three separate studies.

IBM literature, however, describes SMF as an optional support function that "collects and records system information. The information obtained can be used in management . . . reports that describe system efficiency, performance and usage."

SMF has long been considered at least imprecise by a number of independent people concerned with computer performance evaluation. Now there is new evidence indicating just how inadequate SMF really is.

The evidence comes from studies conducted recently at three separate users' installations. In each case the study was geared to evaluation of IBM's and an independent vendor's sort package, and each utilized a hardware monitor to get what were finally considered accurate measurements.

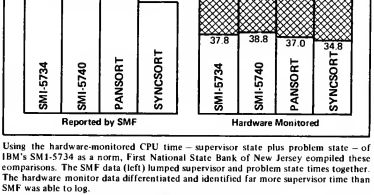
The users involved were the R.H. Donnelly Corp. of Des Moines, Iowa; Transamerica Information Services, Los Angeles; and First National State Bank (FNSB) of New Jersey, Newark, N.J.

Each evaluated Syncsort from Whitlow Computer Systems, Inc. and one or more of IBM's sorts. FNSB also evaluated Pansort from Pansophic Systems.

Transamerica has its own hardware monitor permanently attached to its CPU and uses it for system tuning as well as evaluations of new products. A Tesdata 1020-D hardware monitor – the little Microsum – was leased especially for the tests at Donnelly and, apparently, at FNSB as well.

Scott Moore of Donnelly was the first of the three users to become concerned about SMF during the sort evaluations. He found SMF recorded equal CPU utilization by both Syncsort and IBM's SM1-5740 in handling one of the company's typical sorts, but supervisor state CPU time of SM1-5740 appeared to be

(Continued on Page 4)



Using the hardware-monitored CPU time – supervisor state plus problem state – of IBM's SM1-5734 as a norm, First National State Bank of New Jersey compiled these comparisons. The SMF data (left) lumped supervisor and problem state times together. The hardware monitor data differentiated and identified far more supervisor time than SMF was able to log.

U.S. May Use Xerox Data in IBM Case

By Edith Holmes
Of the CW Staff

NEW YORK – In response to a subpoena, Xerox Corp. shipped 5,000 pages of documents dealing with its decision to leave the computer industry to the Department of Justice last Wednesday.

The government plans to explore the Xerox exit for possible use in its antitrust suit against IBM, Raymond M. Carlson, lead attorney for the U.S., told Judge David N. Edelstein, the sole arbiter in the case, during an in-trial hearing held here last week.

While the trial is scheduled to reconvene Monday, Sept. 22, following a two month recess, Carlson said there will be time in the weeks ahead to discuss the Xerox exit.

His staff will review the documents sent by Xerox and then discuss with IBM counsel those which the government will enter as evidence in its case, he said.

Trying charges that IBM monopolized the general-purpose computer systems market from the early 1960s to the early 1970s, U.S. vs. IBM recessed in the middle of July to give both parties time to complete discovery and depositions relating to the so-called "new issues" – charges that IBM monopolized the peripherals and leasing markets of the industry.

On the Docket

The government will reopen its case with the continuation of the market definition aspects of the suit. Beginning this week with James H. Binger, chairman of the Executive Committee of Honeywell, and Clarence W. Spangel, executive vice-president of Honeywell, several industry witnesses will take the stand in the next few weeks.

William C. Norris, chief executive officer and president of Control Data Corp., will follow Binger and Spangle if he returns in time from a visit with the Israeli prime minister.

The government expects to have some changes in those areas of its witness list relating to peripherals, the Xerox documents just received and some financial aspects of the case developed this summer, Carlson said.

(Continued on Page 4)

CDC Takes Plunge to Key-to-Disk With 'Distributed Data Entry' Unit

By Patrick Ward
Of the CW Staff

MINNEAPOLIS – Control Data Corp. has entered the key-to-disk arena with a "distributed data entry" product CDC said can handle up to 63 local or remote keystations.

The system, called Cyberdata, allows large users to replace five or six small, separate key-to-disk systems with two of the larger Cyberdata systems, a CDC spokesman said.

The CDC product can also support just one or two keystations in remote areas where that is all the capacity needed, he said.

The Cyberdata system will be able to offer further hardware consolidation next March when CDC adapts it to concurrently drive CDC optical character recognition (OCR) equipment in the background area while data entry continues in the foreground, the vendor said.

Currently available Cyberdata systems can handle OCR separately, permitting a user to do key entry during the day and then use the system's processor to run an OCR device at night, the CDC spokesman said.

The Cyberdata system currently cannot transmit batch data to a host computer. However, CDC said it will offer IBM 3780-compatible transmission capability in November, and early next year a CDC-compatible line protocol will be

(Continued on Page 2)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone (01) 485-2248/9; Telex: 264737. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141 Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass 02160 © 1975 by Computerworld, Inc. All rights reserved

50 cents a copy. $12 a year in the U.S.; $20 a year for Canada and PUAS; all other foreign, $36 a year. Four weeks notice required for change of address.

Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700.

COMPUTERWORLD, INC.
Board Chairman/ Publisher — Patrick J. McGovern
President — W. Walter Boyd
Vice-President — Margaret Phelan
Editorial Director — Dr. H.R.J. Grosch

ABP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Massachusetts 02160.

CDC Takes Dive Into Key-to-Disk Waters

(Continued from Page 1)

available, the firm said.

A concurrent tape-to-print capability will also be offered as a major Cyberdata enhancement set for next March, the CDC spokesman added.

Introduced 'Too Soon'

CDC originally introduced the Cyberdata system in Europe two years ago. That was "too soon," and led to some problems, the spokesman said.

The North American version is an enhanced and time-tested unit, he added.

Like other key-to-disk systems, the Cyberdata system formats and edits keyed data. The system signals an operator when its error or range checks find a discrepancy.

The data entry supervisor can create formats by keying them onto the screen, the CDC spokesman said.

The Cyberdata supervisor console allows the data entry supervisor to communicate with the system to check job status and workload, CDC said.

The user can program the Cyberdata system in Owncode, an Assembly-type language. However, CDC expects to release a higher level language next March, the spokesman said.

The Cyberdata is not intended as a distributed data base system and does not provide for on-line file updating, the spokesman said.

Basic Equipment

The basic Cyberdata system uses a 56K CDC System 17 processor, has a cartridge disk drive offering 8.8K bytes; a 7- or 9-track, 1,600 bit/in. tape drive; a supervisor console controller; and eight key-entry stations.

The system can have a maximum of four 128K cartridge disk drives, four tape drives, eight controllers and 63 CRTs.

CRTs are available with either 32-character or 480-character displays. Both types feature IBM 029-type keyboards.

A cluster of up to eight remote keystations can communicate with the Cyberdata host through a CDC 970-26 controller which multiplexes the data for synchronous transmission at up to 9,600 bit/sec.

Single, remote keystations can be linked to the Cyberdata systems with a Bell 103-type modem over dial-up lines.

Optional peripherals include a 300 card/min reader. Both 300- and 1,200 line/min printers are available.

The Cyberdata system, previously introduced in Europe, is Control Data Corp.'s first entry in the key-to-disk arena. A forthcoming enhancement will allow it to support both key-entry and optical character recognition (OCR) processing at the same time.

The CDC 929 OCR document reader processes original documents and single sheets and cards with a maximum throughput of 1,200 document/min.

The CDC 959 OCR document page reader accepts typewritten, handwritten or computer-generated source documents in the form of pages, separated fanfolds, small forms or cards or journal tapes.

Throughput is said to be 720 full page/hour or 18,000 small document/hour.

The monthly lease price of a typical Cyberdata system with 14 key-entry stations comes to $2,914, maintenance included, on CDC's commercial term plan. Purchase arrangements are also available, and delivery to U.S. customers is immediate, CDC said.

Users With Independents' DBMS Happier Than Those With IMS

(Continued from Page 1)

the scattered returns on a broad range of packages users considered DBMS were not analyzed.

Averaging a mass of answers can lead to some perhaps unwarranted results or to a suspicion the results are mathematically accurate, but meaningless.

It is interesting, therefore, to note the majority of the package ratings for both Total and IMS were in the "good" category. For both Adabas and System 2000, most package votes were "excellent."

The same pattern held in vendor support ratings, but the Total users weren't quite as consistent in this voting. "Good" was the heaviest single category, but that vote tally made up only a plurality of the ballots.

Many readers asked for comparisons of the technical features of the various DBMS. Time and space seem to rule out fulfilling that request in detail, but several of the ballots indicated the users were using two DBMS and were willing to make comparative evaluations.

One reader, for example, noted after working with both Burroughs' DMS-II and IBM's IMS: "It takes twice as long with people of a higher skill level to bring up an IMS system than a Burroughs."

Another user, with Total and System 2000, rated both as having "good" capabilities, but differentiated in the vendor support, ranking Total's backing as "good," System 2000's as "average."

A third user, with four years of experience on IMS and "7.75 years" with Honeywell's IDS, rated the IBM product and support as "excellent," the Honeywell product and support as "average."

On the Inside This Week

NEWS
Program Generator Cuts Firm's Staff 5
Report Urges Center for DP in Chemistry 6
New Techniques' Chief Value Seen in Program Upkeep 7
Charges of Discriminatory Specs Delay Ark. System 8
DPMA Education Foundation to Provide Programs 10
Afips Booklet Has Details on Constituent Societies 11

EDITORIAL
Editorial: Not So Fast, Everyman 14
White Hat, Black Hat: To Run a Railroad 15
Taylor Reports: Ignoring 'Hot Spots' Protects Airlines ... 15

SOFTWARE & SERVICES
Data Base Systems Found Across Wide Range of CPUs ... 17
Choice of First DBMS Project Vital But Tricky Chore 19
American Honda Uses Remote-Computing Net for IMS ... 21

COMMUNICATIONS
Telenet, Tymshare Compete for Users' Data Packets 23
Memorex Net Processor Can Replace IBM 270X, 370X ... 25
Transition From Batch to On-Line System No Cinch 26
Terminal Tied to T/S Network Negates Need for S/3 27

TERMINAL TRANSACTIONS
HP CRT Features Built-In Mass Storage 28

SYSTEMS & PERIPHERALS
Centralization or Decentralization: Which is Best? 29
System Shortens Registration Process at University 31
Tabletop Card Reader Expands 1300 Line Capabilities ... 33

MINIWORLD
Raytheon System Weds Mini, Terminals, Software 35
Hardware Savings Lost in Software Development 38
Mini Cuts System Costs 50% as Engineers' Work Doubles . 39

COMPUTER INDUSTRY
Recession Sparking Sale of Software, Vendors Agree 41
Micros' Market Success Dependent on Software 41
Financing Alternatives Urged for Young Companies 43
Lower Cost of Printers Linked to Mini Market Growth 44

FINANCIAL
Two Time-Sharing Firms Up Revenues 54
DPF Reports Earnings in Black Despite Revenue Drop 54

Bad Taste — Not Fraud — Ruled In Offer to Sell Credit Records

By Ronald A. Frank
Of the CW Staff

NASHUA, N.H. – A letter from a credit bureau offering to sell consumers a copy of their credit records for $7.50 may have been in bad taste, but it did not constitute fraud.

That was the finding of the Hillsborough County Superior Court concerning a letter sent to consumers by the Credit Bureau of Nashua, Inc. [CW, June 18].

While the letter, sent to 60,000 area residents, was "in very poor taste," it did not constitute a case of fraud or misrepresentation, according to Justice Martin F. Loughlin. Statements from the credit bureau, however, indicate the letter may have been designed to test credit-reporting laws.

The court ruling marked the second defeat in the case for the Consumer Protection Division of the New Hampshire Office of the Attorney General. The state agency had acted after it received numerous complaints from recipients of the letter.

The complaints objected to the statement that "we have decided to give you a chance to obtain sole possession of your complete file before it becomes part of a large computerized data bank, which may allow unlimited access by thousands of people."

Challenged on Two Counts

The Consumer Protection Division went to Superior Court and challenged the credit bureau on two counts. First, the division alleged, the credit bureau could not sell its files without notifying the affected consumers and gaining their consent; this is a requirement of the New Hampshire Fair Credit-Reporting Act, the division said.

Second, the attorney general's office alleged the letter contained misrepresentations which should be corrected with a second letter. The court was also asked to order the money paid by consumers to obtain copies of their files be refunded.

The Superior Court granted an injunction against the credit bureau, but this was later lifted when Loughlin ruled the credit bureau had the right to sell its files under the state Fair Credit-Reporting Act.

The Consumer Protection Division appealed to the New Hampshire Supreme Court, but the higher court said it agreed with the original finding.

Most recently, the Superior Court again ruled against the Consumer Protection Division, this time on the count of misrepresentation. Loughlin said it was understandable many consumers had complained about the wording of the letter, but there was no fraud involved.

'Court Erred'

"We believe the court erred and we intend to appeal the decision," Richard Wiebusch, assistant attorney general and chief of the Consumer Protection Division, said.

It will be up to the Superior Court whether the appeal will go to the state's highest court, and such a step appears probable, he added.

While the injunction was pending, the credit bureau refunded the $7.50 sent by many consumers who had received the letter. Those who paid the fee to obtain "sole possession" of their files were told 15 days would be required "for processing."

Originally, Wesley Pike, owner of the credit bureau had planned to close down the credit operation. He reportedly had rejected an offer to sell his credit files to a national credit-reporting service.

The letter was sent to consumers at the end of May and, on June 15, the Credit Bureau of Nashua said it would end its credit operation. After the recent court decision, however, the attorney for the credit bureau, Joseph Kerrigan, said the credit operation had resumed.

The credit bureau has survived an "unsuccessful legal assault" and has terminated its negotiations to sell the credit files, Kerrigan said. He indicated the letter and the subsequent legal proceedings had been purposely planned to test the legal rights of the credit bureau.

Wiebusch said his office still has the case under active consideration and added the Consumer Protection Division will take whatever steps are required to protect the interests of the public.

No date has been set on further Superior Court consideration of the appeal by the Attorney General's office.

DP Dunning of Consumers To End Next Month

WASHINGTON, D.C. – DP departments of companies that extend credit to consumers will have to develop ways to resolve billing disputes with their customers by next month.

Repeated dunning of customers with computer-generated overdue notices will no longer be permitted under regulations issued recently by the Federal Reserve Board.

The regulations were issued to implement the Fair Credit Billing Act, which becomes effective Oct. 28 [CW, April 9].

Under the rules, a creditor must acknowledge a written inquiry from a customer within 30 days and resolve the dispute within 90 days.

During this period, the customer does not have to pay any disputed bills and the creditor cannot try to collect the amount in dispute or any finance charges on it. Further, the customer's account cannot be closed.

Creditors who fail to comply will be subject to forfeiture of the disputed amount, up to $50, regardless of whether an error was made.

Creditors must advise credit users how and where to file a claim for a billing error in the first normal billing cycle after Oct. 28.

This information must be sent at least twice a year, or an abbreviated version may be sent with monthly billings, the regulations said.

DP departments have been granted a six-month transition period in which to print forms or effect systems changes.

Users Report SMF Inadequate as Measurement Tool

(Continued from Page 1)

twice as high as that of Syncsort.

That situation came to light with a program Moore wrote to "consume and count" all available CPU cycles in the system. The hardware monitoring indicated clearly that SMF faithfully records all of a user's problem state cycles, but misses much of the time used by the system itself.

Prior to each evaluation, SMF data was analyzed in order to determine the sorting characteristics at the particular installation. The analysis was done with a program built for the purpose by Whitlow, the Syncsort vendor. Each center then selected from its own libraries, the files which seemed closest to its typical characteristics.

At the end of the tests, FNSB found that while SMF indicated an 8.6% reduction of CPU utilization by SM1-5740 compared with SM1-5734 (another IBM sort), the hardware monitor indicated a 5.3% increase in true CPU time.

At Transamerica, SMF indicated an 8.6% increase of CPU utilization by Syncsort vs. SM1-5734, but the monitor showed a 25.1% reduction in true total CPU time.

At Donnelly, the hardware monitor logged a 43.1% reduction in true total CPU time when Syncsort was used rather than SM1-5740. SMF, working with exactly the same files and the same sort packages, showed only a 24.9% reduction.

Lower I/O Activity

In related tests on other parts of the system used during sorting operations, Whitlow and the users found a general trend to lower I/O activity as EXCPs were reduced – generally by increasing file block sizes. But the reduction in true I/O activity – device busy time or channel time – was "far from proportional to the reduction of EXCPs," Whitlow noted.

The device busy time consists of three components: seek time – as the disk arm moves; latency – turn of the disk once the arm is in position; and data transfer time. True utilization of I/O resources has a complex dependency not only on the number of EXCPs issued, but also on what is involved with each EXCP.

A few transfers of long data blocks may take a much longer time than numerous transfers of smaller data blocks, Whitlow noted.

Tests at FNSB indicated SM1-5740's device busy time compared with that of SM1-5734 increased by 18.9% in multiprogramming which indicated, according to Whitlow, "the unsuitability of SM1-5740's sorting technique [the so-called Peer sort] to multiprogramming" environments.

By contrast, the vendor noted with some pride, Syncsort improved its device busy time by 21% when executing in multiprogramming situations.

A 45-page report documenting the findings at the three sites is available free from Whitlow Computer Systems, 222 South Marginal Road, 07024.

U.S. May Use Xerox Exit Data

(Continued from Page 1)

Depositions and IBM documents will not play as significant a role during these next weeks as they did in the first seven weeks of the trial, but third-party documents such as those from Honeywell will be dealt with during testimony, Carlson noted.

The parties issued a joint progress report to the court; however, this was described by a spokesman for the judge as "an internal document that will not be filed" and therefore will be unavailable to the public.

Remarks made during the hearing, though, indicated progress has been made concerning the legibility of the IBM documents the government will enter into evidence over the next few months.

A senior member of the Justice Department team, Joseph Widmar, reported 350 documents are ready to be marked and put into evidence. Another 100 to 200 are in various stages of reconstruction and reproduction, he said.

The parties are also on the verge of agreeing to a stipulation of the titles and positions of IBM officials and employees and to a joint statement of issues in the case.

IBM and the government have yet to settle on whether the Telex record will be accepted in whole or in part. IBM said it will agree to incorporate the entire Telex record into the record of this case to save both the court and counsel time.

"To do otherwise would be to waste time discussing issues that aren't really controversial," Thomas D. Barr, lead IBM attorney from Cravath, Swain and Moore, said.

He suggested the reason no progress had been made on such an agreement was that Carlson had not taken time to deal with the subject. Carlson responded that he only took exception to some stipulations of fact in the Telex record and that he would weed these out so the rest of the record could be incorporated.

IBM Dragging Feet

In its turn, IBM dragged its feet on accepting the record in this case to prevent a mistrial if anything happens to the judge.

Barr said he was willing to discuss accepting the record in segments as the case progresses, but he would not waive his client's potential right to another trial.

Edelstein commented he plans "to do everything I can through appropriate channels" to make such agreements a matter of legislative course.

Despite his concern, Edelstein exhibited a greater sense of humor on the state of his health than he has in the past.

"I underwent a complete physical examination for the first time in five or six years," the judge said. "You gentlemen have accomplished what my wife couldn't.

"The doctor didn't prescribe any drugs, but he did give me a hefty bill. As a matter of fact, that was the first sick moment I've had."

Correction

The names under the photos of Ron Huch and Hank Weiss of Centronics Data Computer Corp. were inadvertently switched [CW, Sept. 17].

Standardizes Efforts

Program Generator Cuts Firm's Staff

By Edith Holmes
Of the CW Staff

NEW YORK – By using a high-level language program generator, an apparel manufacturer has minimized its DP staffing requirements and standardized its programming effort.

Nearly 100% of the programs used by I.C. Isaacs & Co. have the results of the program generator at their nucleus, according to Robert E. Kallstrom, DP director of the firm, which makes some five million pairs of slacks each year and is based in Baltimore, Md.

"Programmers are relieved of all mundane tasks and can concentrate on tricky logic problems," Kallstrom told an audience at Info 75 here recently. "And the package itself costs less than one programmer."

Requiring no more memory than the system's Cobol compiler, the program generator from Programming Methods, Inc., a division of GTE Information Systems, Inc., is called Score and runs on I.C. Isaacs' rented Univac 70/45 which operates in 360 emulation.

"We selected Score rather than a report writer, a data base manager or a file management package because the program generator creates good Cobol source programs from many available parameters," he said. In addition, Score permitted the firm to standardize data names. The program operates with such procedural names as "get-master."

Generates Programs

More than a report writer, Score can be used with up to eight files to generate programs, Kallstrom said. Fields can be rearranged, records reformatted and hash totals generated, he added. Score also has file and test data generation capabilities as well.

And the program generator can be used on any other system so long as there is a Cobol compiler. As I.C. Isaacs is going to a Univac 90/30 soon, this kind of flexibility was an important consideration in selecting Score, Kallstrom said.

He noted that, in addition to increasing programmer productivity, the program generator has eliminated the high cost of file management and reduced the time previously required to answer user requests.

Still another positive feature is the small amount of time needed to learn to use the generator. "A three-day training period is all that is required," Kallstrom said.

But, while the generator creates programs at a rapid rate and has decreased the need for several experienced programmers, the code turned out is generally less efficient than that written by programmers, he added.

"The effectiveness of the package is dramatic in terms of the number of lines generated, but that measure is misleading because everything turned out is not necessarily approved," Kallstrom said.

In trying to sell the system to users who remembered the firm's two previous, unsuccessful attempts to move from manual to automated inventory and account handling, the program generator had made special requests too easily answered, he added.

Two years after the system was installed, "users are so enthusiastic about it, the abundance of short-term requests sometimes interferes with long-range company projects," Kallstrom said.

"And when users come up with highly complex programs, they expect the same quick turnaround from the program generator and the DP staff that a much simpler project permits," he added.

But, given I.C. Isaacs' desire to show some results from the DP system early, to respond quickly to special requests and to build user and management confidence in an automated system, Kallstrom maintained the program generator is still an important part of the hardware, software and personnel mix needed to accomplish those goals.

NCIC 'Hit' Tags Attacker

EDWARDSVILLE, Ill. – A young woman, taken to a rural area of the Southern Illinois University campus here, assaulted and robbed, had little hope her assailant would be found. The only clues she could give police were a description of her attacker and his automobile.

A single traffic ticket, apparently dropped by the assailant at the crime scene, broke the case.

A check of the state's computerized drivers' licenses showed him to be a Chicago resident and possibly a university student.

Police entered the tag number into the Law Enforcement Agencies Data System and the National Crime Information Center (NCIC) as a felony vehicle.

Several days later, following a holdup, an officer of the Mooresville, Ind., police department apprehended a man driving the same vehicle and received a hit through NCIC.

Report Urges Center For DP in Chemistry

WASHINGTON, D.C. — An urgent need exists for more adequate computational resources in the field of chemistry, according to a recent National Academy of Sciences publication, "The Proposed National Resource for Computation in Chemistry: a User-Oriented Facility."

Comprehensive studies recently undertaken by the academy's National Research Council (NRC) suggested "a National Resource for Computation in Chemistry (NRCC) be organized as a user-oriented facility, with hardware and personnel dedicated toward serving the needs of the broadest chemical community," the report said.

Such a resource "will be more cost-effective than a further increase in the application of computers as presently practiced and will contribute to the solution of important current national problems."

The NRCC, once established, will need "a computer having the speed and memory of a [Control Data Corp.] 7600, an IBM 370/195 or their equivalent" to fulfill its function, the report said.

Copies of the report are available without charge from the Office of Chemistry and Chemical Technology, NCR, 2101 Constitution Ave., 20418.

Virginia Joins CCH System, Brings Members to Seven

WASHINGTON, D.C. — The State of Virginia has started to enter computerized criminal history records in the Federal Bureau of Investigation's Computerized Criminal History (CCH) system.

This brings the number of CCH participants to seven. The others are Arizona, Florida, Illinois, California, Michigan and the District of Columbia.

Since the CCH data base began in November 1971, the number of computerized records it contains has grown to 649,785.

System 'Runs' Olympics

MOUNT PLEASANT, Mich. — Computerized Olympics? Not exactly, but a computer did play a major role in running the International Special Olympics for mentally retarded athletes here recently.

Bill Dunham, associate registrar at Central Michigan University, where the Olympics took place, began setting up registration for the event almost two years ago.

Registration forms were developed to obtain information ranging from events in which the children participated to medical and parental releases.

Once entered into the university's Univac 1106, the data was used to chart each individual's activity for the five days of competition.

New Techniques' Chief Value Seen in Program Upkeep

By Edith Holmes
Of the CW Staff

NEW YORK – Improved programming technologies like structured programming and top-down development can increase the productivity of a shop by 50% at most, according to a senior systems analyst.

"But producing code faster is only part of the story," Linda Jones of Consolidated Edison Co. in New York said. "While there are no controlled studies as yet, estimates of program maintenance reduction when these programming techniques are used range from 50% to 80%."

Productivity improvements of up to 100% can be anticipated where interactive programming is used, Jones told attendees at the recent Info 75 here.

Why worry about productivity at all? Noting the amount of time DP operations must spend just to maintain their present equipment and software, Jones quoted an IBM study indicating most shops have a three-year backlog of applications they would like to implement.

To help solve this problem, Jones discussed the variety of programming productivity techniques available – most of which have been devised by IBM and, with one exception, are independent of hardware and software.

These techniques include chief programmer teams, structured design, hierarchical input processing output (Hipo) charts structured walk-throughs, structured coding and top-down development. She added interactive programming to the list as well.

All of these approaches are applicable in large and small installations and, ultimately, they work to discipline the programming process, Jones said.

Few installations have implemented the whole package of techniques, and Hipo, structured programming and top-down development are probably the most common, she added.

Chief Programmer Teams

A chief programmer team is headed by someone with 10 to 15 years of experience, according to Jones. With management responsibility, the chief programmer is held accountable for the final product of the team, which consists of an assistant chief programmer, a program librarian and programmers.

In addition to improving programming efficiency, this approach provides a technical career path for programmers and promotes the education of the younger members of each team, Jones said.

"A disciplined method for achieving a reliable modular program," structured design depends on the strong binding of the elements within each module of a program and the weak coupling of these modules together in the program to minimize the effects of modification to specific modules.

Hipo is "ideal for expressing a structured design," according to Jones. "A Hipo chart provides the programmer with a visual table of contents or overview of the program, enabling him to code directly without the traditional flow charting that is often neither desirable nor necessary."

Structured walk-throughs are designed to find any and all errors in programs.

Walk-throughs should aim at analyzing the functional design of a program, discovering logic errors, eliminating coding errors and incorporating a testing strategy into the development process, Jones said.

They should be scheduled by the person whose work is to be reviewed, have no management participation, emphasize error detection and result in some "action list" for correcting program mistakes, she added.

Structured Coding

A fifth approach to improving programmer productivity is structured coding where each module has exactly one entry and one exit, Jones said. Three basic coding structures are used: sequence, IF THEN ELSE and DO WHILE or DO UNTIL, she said, adding that the case structure is "a useful extension of structured coding in the real world."

"Structured programs are highly readable and are easier to debug and test," she explained. "Instructions on one aspect of a program are all in one place – the familiar 'come from' problem is eliminated because there are no GO TOs."

Finally, Jones discussed top-down development, an approach in which the highest level code is written first. Lower level modules are then coded, integrated and tested one by one.

There is no need to write driver programs, she said, and, while a "stub" must be written for each lower level module, "these are simple enough for junior programmers or the program librarian to generate."

Though not part of the IBM package of productivity techniques, interactive programming provides "powerful editing and fix-up capabilities," according to Jones. This approach gives the programmer immediate feedback, interactive debug facilities and interpretive compilers, she said.

Development Costs Limit DP

NEW YORK – The high cost of application development is the principal factor limiting the extension of data processing, a panel of people concerned with this aspect of DP have agreed.

"Personnel are the most expensive element in the DP budget, and they spend most of their time developing applications," according to David A. Nelson, an independent consultant from Moorestown, N.J. and chairman of the session on improved technologies for applications development.

"Vendors have nearly as much at stake as do users – if there are no new applications, there will be fewer hardware demands and sales," he said at the recent Info 75.

The panelists agreed that, to make applications development more cost-effective, a shop can either improve the quality of its people through programming productivity techniques or decrease the level of skills required of its personnel by using such technical devices as a high-level language program generator.

Charges of Discriminatory Specs Delay Ark. System

By Toni Wineman
Of the CW Staff

LITTLE ROCK, Ark. – A charge of discriminatory specification has caused the indefinite postponement of bid openings for a state computer system here.

The postponement came after the state Information Systems Executive Committee (Isec), a cabinet-level group which must approve new or expanded computer systems for state agencies, received complaints that the bid was "very restrictive" and limited proposals to an IBM System/3 or its equivalent, according to Richard Heath, director of the state Finance and Administration Department.

The computer in question was for the Health Department, which has outgrown its IBM 360/20. The system would give the department added computing capability and allow it to interface with the state's central computing facility comprised of duplexed IBM 370/145s.

Isec received an outline of the originally proposed specifications which it approved, Heath said. The proposal was then sent to the Office of Purchasing where the invitation to bid was prepared.

"But there were certain things either put in or added during this whole process that basically made it turn out to be a bid for a System/3 or equivalent," Heath commented.

"That's not what we had in mind, so we pulled the bid down and redrafted it," he said.

A spokesman for the Purchasing Department, Ed Eudy, said the department had to rely on its users to provide fair specs for invitations to bid.

"Many times it's inadvertent, but many times there is a certain amount of bias and we can't catch it because the people who are on the administrative end of the thing simply are not familiar enough with computer equipment to be able to ascertain whether or not these people are writing exclusive bids," Eudy said.

"Many times what happens is that we end up with egg on our face and that's just the way it is," he added.

Vendor Complaints

Heath said he had received a verbal complaint from a Univac representative and had learned of a verbal complaint made by Burroughs charging the request for proposals (RFP) was discriminatory.

As a result of the complaints, "I personally got a copy of the invitation to bid and brought it up at the Isec meeting, as a result of which the bids were not opened," he said.

Twenty-one letters were received which, Heath said, he assumed were mainly bids, "though some of them may have been saying they declined to bid." The letters were returned unopened to the senders.

A revised RFP was drawn up by Gordon Stokes, a consultant hired by the state legislative committee, "changing some of the mandatory requirements just slightly so a substantially larger number of vendors would be able to bid," Heath said.

Eudy could not say exactly what changes had been made in the RFP but said it looked like a format change: "Certain portions of the equipment were not as well-defined."

When a piece of equipment is needed, Eudy noted, someone defines that equipment, on an agency level, in terms of the way the agency wants to use it.

In writing this proposal up, he may be schooled either by experience or by salesmen, he said.

"If it is by experience, then typically, within our state's system, the most prevalent form of computer equipment is manufactured by IBM," Eudy said.

There are now other companies besides IBM who can offer the same services, Eudy stated. "Perhaps the services may not incorporate the same type of equipment, but they do finally the same job.

"Now there is always the opportunity to bid an alternate," Eudy said. "However, many people within the industry feel reluctant to bid a completely different system for fear it may not be adequately reviewed."

Need for Procedures Seen Major Effect Of 1974 Privacy Act

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. – One of the major effects the Privacy Act of 1974 will have on government agencies is the establishment of administrative procedures, two government officials said here recently.

The Department of Health, Education and Welfare (HEW) has elected to consider itself as one agency, according to Lee Wouters, an analyst in the office of the secretary of the Office of Management Planning and Technology.

This will permit the transfer of records between the department's components, such as Social Security, Education, Social Rehabilitation Service, Public Health and the Office of Consumer Affairs, he said at this month's IEEE Computer Society conference.

HEW decided to centralize its planning functions for implementing the Privacy Act, and the administrive procedures will be performed on a decentralized basis, he explained.

In addition to transferring records, other advantages of HEW's central planning method are that it allows the secretary to guide implementation and should eliminate redundant efforts and provide flexibility of parts, Wouters said.

Also, one set of agency regulations was published in the *Federal Register*, he said, which simplified matters for other departments wishing to deal with any parts of HEW.

Publishing lists of the data banks it maintains, as required by the law, probably was more helpful to HEW than it was to the public, he observed.

HEW thinks it has cut through bureaucratic levels by allowing individuals who are dissatisfied with a decision made on the local level to add to his file to see an assistnt secretary.

HEW is issuing a list of safeguards for security at DP sites and terminals, he said, and then the various departments will individually select the technology and administrative techniques, pending review by an assistant secretary, Woulers said.

Before you buy your 3270's, listen to how our story plays.

Computer Optics new five-year lease gives you all the cost advantages IBM offers without locking you into a purchase.

There's no capital appropriation required at the front end. No risk of being tied down to obsolete equipment. No staggering cost penalty as you expand your display network.

Instead, there's a flexible lease arrangement that lets you keep our equipment from two years to five years. Or forever if you want. And saves you money on your monthly display system costs for every month that you keep the system.

How does it work? You simply sign a five- year lease for our CO:77 display system. A system that's totally compatible with IBM's 3270 and requires absolutely no changes in your software. You can terminate the lease after two years. Or you can keep it for five years and convert it into a purchase.

How much can you save? As much as 50% in your monthly display system costs depending on your system configuration, the size of the purchase credit you've earned on the 3270's you buy, and the number of additional display units you require.

To show you your exact savings, we've put all the figures on a single record. For any display configuration, it plays back the monthly cost with a Computer Optics five-year lease, and the monthly cost of various 3270 plans.

Send for one and compare CO:77 prices. You'll like the way they sound.

The Complete Score. The Computer Optics Flexible Lease Plan and the 3270 lease and purchase plans.

Mail to:
Computer Optics Inc.
Berkshire Industrial Park
Bethel, CT 06801

Send me the record:

Name_____

Title_____

Company_____

Address_____

_____ Zip_____

Phone_____

Call toll free 800-243-1314. In Connecticut call collect (203) 744-6720.

DPMA Education Foundation to Provide Programs

PARK RIDGE, Ill. – The Data Processing Management Association (DPMA) has officially established an education foundation and appointed a five-member board of regents.

The major purpose of the foundation will be to provide education programs and services for DP professionals, educators, the computer industry, business, government and the general public.

One of its first projects will be to conduct a survey to identify the educational needs of the DP community, according to the DPMA group.

Societies/ User Groups

The foundation's first president is Roland D. Spaniol, director of computer services and professor of management at Eastern Illinois University. He also served as chairman of the organizing committee that established the foundation.

Other members of the board of regents are Howard B. Wilson, general director of management information services, Reynolds Metal Co.; George Glaser, consultant and former president of the American Federation of Information Processing Societies; Eugene B. Smith, associate professor of the business and research department of Texas A&M University; Edward Palmer, DPMA president; and T.David McFarland, DPMA acting executive director, as an ex-officio member.

The board of regents will supervise, control and direct the affairs of the foundation.

DP-Generated Art Set As ACM '75 Display

NEW YORK – The Association for Computing Machinery's (ACM) annual conference in Minneapolis/St. Paul on Oct. 20-22 will feature a computer-generated art display.

ACM '75 registrants will also be given an opportunity to generate their own "real-time" art on interactive terminals while computer-composed music plays in the background.

The art exhibit, including both audio and visual works, will display objects such as wall hangings, 35mm slides and movies.

Works of art for display in any of the above media are being solicited and those interested should contact G.A. Champine, chairman, Computer Arts, 11006 Radison Drive, Burnsville, Minn. 55337.

BCS, ACM Pact Gives Members Reciprocity

LONDON – The British Computer Society (BCS) and the Association for Computing Machinery (ACM) have signed an agreement for reciprocal membership.

The pact allows BCS members to join ACM at a discount of 20% from the usual subscription rate, and vice versa.

Members of the societies will be bound by the rules of the ACM or BCS and receive all benefits and rights of their grade, including publications.

"International cooperation and interchange of ideas between computing practitioners is especially important since the computing industry is international both in outlook and practice," Ewart Willey, BCS president, said.

NMA Forms 31st Chapter

WASHINGTON, D.C. – The National Micrographics Association (NMA) has formed its 31st chapter in Buffalo, N.Y.

After approval of its charter by the NMA board of directors, it will be known as the Western New York Chapter of NMA.

Calendar

Oct. 22-24, San Diego – 43rd Management Conference, sponsored by the Association of Data Processing Service Organizations (Adapso). Contact: Adapso, 210 Summit Ave., Montvale, N.J. 07645.

Oct. 23-24, Gaithersburg, Md. – Second National Symposium on the Management of Data Elements. Contact: Institute for Computer Sciences and Technology, NBS, Washington, D.C. 20234.

Oct. 28-30, Toronto – The Canadian Computer Show and Conference. Contact: Derek A. Tidd, Industrial and Trade Shows of Canada, 481 University Ave., Toronto M5W 1A7.

Oct. 29-31, New Orleans – Mid-Year Meeting of the National Micrographics Association. Contact: Conference Dept., National Micrographics Association, 8728 Colesville Road, Silver Spring, Md., 20910.

'All You Ever Wanted to Know...'

Afips Booklet Has Details on Constituent Societies

MONTVALE, N.J. – A newly revised brochure entitled "All You Ever Wanted to Know About Afips Constituent Societies . . .But Could Never Find in One Place" has been published by the American Federation of Information Processing Societies (Afips).

The 24-page booklet defines the goals and purposes of each of the 15 professional societies in Afips in addition to listing membership requirements, activities, society publications, dues structures and the individual to contact for further information.

Societies/ User Groups

The publication also briefly describes the objectives and major activities of Afips.

Constituent societies discussed include the American Institute of Aeronautics and Astronautics, American Institute of Certified Public Accountants, American Society for Information Science, American Statistical Association, Association for Computational Linguistics, Association for Computing Machinery, Association for Educational Data Systems, Data Processing Management Association, IEEE Computer Society, Institute of Internal Auditors, Instrument Society of America, Society for Computer Simulation, Society for Industrial and Applied Mathematics, Society for Information Display and Special Libraries Association.

The brochure is available free from Afips' Public Information Office, 210 Summit Ave., 07645.

Smith Named NCC Board Head

MONTVALE, N.J. – Merlin G. Smith, a research staff member in the Computer Science Department of the T.J. Watson Research Center of IBM, has been named chairman of the National Computer Conference (NCC) board.

Member Since '73

He has served on the board since 1973 and is a member of the executive committee of IEEE Computer Society.

The NCC board is responsible for the operation of the annual NCC sponsored by the American Federation of Information Processing Societies.

Smith has been with IBM since 1952, where he participated in the early development of electronic computers. His current research activities are concentrated in the area of terminal-oriented systems and communications.

Call for Papers

1975 COLLEGE AND UNIVERSITY SYSTEMS EXCHANGE NATIONAL CONFERENCE, Dec. 3-5, Denver.

Papers are sought on a wide range of subject matter related to the conference theme, "Higher Education Information Systems: The Challenge of Change." They should be applicable to one of the three major conference tracks: management topics, technical topics and management-technical topics. There will also be a special session for contributed papers not included in these tracks.

Abstracts should be sent as soon as possible to College and University Systems Exchange, 737 29th St., Boulder, Colo. 80303.

THE FIFTH ANNUAL ASSOCIATION OF COMPUTER PROGRAMMERS AND ANALYSTS (Acpa) NATIONAL CONFERENCE, Oct. 1-3, Itasca, Ill.

In line with its theme of "Awareness: Past, Present and Future," papers are requested on the topics of privacy (data base and/or personal); CP certification, ethical practices in information processing and the implications of licensing of computer professionals.

Manuscripts should be typed, double-spaced and limited to approximately eight to 10 pages of subject matter. Completed papers must be submitted as soon as possible to the Acpa V Conference Committee, P.O. Box 2349, Chicago, Ill. 60690.

MICROGRAPHICS '76, Feb. 12-13, New Orleans.

Micrographics will be the subject of a winter symposium hosted by the Society of Photographic Scientists and Engineers. Papers are invited reporting original, unpublished work in this field; review papers of unusual interest will also be considered.

Authors must submit a one- to five-page double-spaced abstract for review by the Papers Committee no later than Sept. 30. All abstracts should be sent to Dr. H. H. McGregor, Jr., Kalvar Corp., P.O. Box 13013, New Orleans, La. 70185.

NATIONAL MICROGRAPHICS ASSOCIATION (NMA) 25TH ANNUAL CONFERENCE AND EXPOSITION, April 27-30, Chicago.

Papers are requested that follow the conference theme, "Spirit of Micrographics" and should fit into the following categories: "Spirit of Micrographics Technology '76," "Spirit of Micrographics Implementation '76" and "Spirited Applications for Special Interests '76."

Abstracts should be typed, double-spaced and at least 250 words in length. Complete papers must be submitted by Nov. 15.

For further information contact The Spirit of Micrographics '76, Program Review Committee, NMA, 8782 Colesville Road, Silver Spring, Md. 20910.

1976 INTERNATIONAL SYMPOSIUM ON INFORMATION THEORY, June 21-24, Ronneby, Sweden.

The conference, sponsored by the Institute of Electrical and Electronic Engineers, will cover coding theory, communications systems, computational complexity, computer communications, detection and estimation, pattern recognition, stochastic processes and Shannon theory. Papers are invited in these and related fields.

There will be two types of contributed papers – long papers of 30-minute duration and short papers of 15-minute duration. The long papers will be accepted on the basis of a 500-word abstract. Both should be submitted, with an abstract, by Nov. 15 to Jack Salz, Bell Laboratories, Room 1G-505, Holmdel, N.J. 07733.

14TH ANNUAL ASSOCIATION FOR EDUCATIONAL DATA SYSTEMS (AEDS) CONVENTION, May 3-7, Phoenix.

Papers are being solicited in all areas related to computer use in instruction, educational administration or research.

An abstract of not more than 100 words is required by Dec. 1. Final copies should be received by March 1 and should be typewritten and double-spaced on special Aeds manuscript paper.

Mail papers to Mex Ivey, 1976 Aeds Convention Program Chairmen, Campus Systems and Programming, Wilson Hall-Room 206, Arizona State University, Tempe, Ariz. 85281.

REA Air Express beats with cost-cutting

high shipping charges counterpunches!

One

(Covers airport-to-airport service between 104 major cities—over 6,000 markets.)

WEIGHT FROM /TO	1	5	10	15	25	50	75	100	200	300
Chicago/New York										
REA Air Express	5.00	6.50	8.50	11.00	13.50	20.61	24.48	28.70	56.20	82.20
*Federal Express: Priority 1	11 07	13 43	20 53	23 35	26 10	31 10	—	—	—	—
Airborne	7.11	9 89	14 94	17 04	21 60	29 85	33 30	36 38	72 76	109.14
Detroit/Dallas										
REA Air Express	5.00	6.50	8.50	11.90	14.40	22.74	28.05	35.10	66.40	93.60
*Federal Express. Priority 1	11 17	14 63	20 74	23 56	26 27	33 97	—	—	—	—
Airborne	7.11	10 10	15 36	17 67	22 74	32 15	36 73	41.07	82.14	123 21
Atlanta/San Francisco										
REA Air Express	5.00	6.50	8.50	15.50	18.00	31.63	40.76	51.30	100.00	145.80
*Federal Express: Priority 1	11 27	15 73	21.04	25 55	29 96	38 96	—	—	—	—
Emery	7 07	7 47	16.96	21.40	26.91	41 12	54 07	67 01	124.28	186 42
Milwaukee/Miami										
REA Air Express	5.00	6.50	8.50	12.80	15.30	25.21	31.75	39.60	75.00	106.20
*Federal Express. Priority 1	11 17	14 63	20 74	23 56	26 87	33 37	—	—	—	—
Emery	7 07	7 47	16 96	20 92	25 16	35 78	45 25	54 63	98 32	147 48

Two

(Covers airport-to-airport service between major and other cities.)

WEIGHT FROM/TO	1	5	10	15	25	50	75	100	200	300
New York/Chattanooga										
REA Air Express	7.00	9.00	15.00	16.26	20.50	29.62	35.19	41.20	68.00	102.00
*Federal Express	11 07	13 43	20 53	23 35	26 10	31 10	—	—	—	—
Emery	11 00	11 00	17 42	21 16	24 45	32 73	39 62	46 42	84 46	126 69
Denver/El Paso										
REA Air Express	7.00	9.00	15.00	15.57	19.38	26.80	32.33	36.00	64.00	96.00
*Federal Express	11.07	13.43	20.53	23 35	26 10	31 10	—	—	—	—
Emery	11 00	11 00	17 42	20 89	23 48	30 14	35 18	40 15	71 80	107 70
Youngstown/Dallas										
REA Air Express	7.00	9.00	15.50	18.34	23.84	33.98	42.15	53.40	91.40	137.10
*Federal Express	11 17	14 63	20 74	23 56	26 87	33 37	—	—	—	—
Emery	10 94	10 94	17 35	21 74	26 10	37 20	47 24	57 16	105 86	158 79
Miami/Lexington, Ky.										
REA Air Express	7.00	9.00	15.00	17.29	22.14	32.52	38.01	47.00	72.20	108.30
*Federal Express	11.17	14 63	20.74	23 56	26 87	33 37	—	—	—	—
Emery	11.00	11 00	17 42	21 53	25 28	34 75	43 00	51 08	93 88	140 82

Effective Date 7/17/75

*NOTE: PACKAGES OVER 70 LBS. NOT ACCEPTED BY FEDERAL EXPRESS, AND EACH PACKAGE IS AN INDIVIDUALLY PRICED SHIPMENT!

Plus! The complete package of REA Air Express services including:

- Partnership with 22 scheduled airlines.
- Priority service for first-flight-out boarding before *any* other freight at no extra cost.
- Service to more than 450 airports.
- "TEAM" computerized tracking.
- Customer Service Network.
- Widest coverage in the U.S. and Canada.
- One carrier responsibility: one waybill, one simple invoice.

In addition, door-to-door pickup and delivery service by REA Express is available nationwide. For a fast pickup or more detailed information, check the white or yellow pages for REA Air Express and call your local REA representative today, or mail the coupon below.

REA's airline partners include: Air Canada, Air France, Airlift International, Alaska Airlines, Allegheny Airlines, American Airlines, Aspen Airways, Braniff International, Continental Airlines, Eastern Airlines, Flying Tiger Line, Frontier Airlines, Hughes Airwest, National Airlines, New York Airways, North Central Airlines, Northwest Orient Airlines, Seaboard World Airlines, S.F.O. Helicopter Airlines, Texas International Airlines, Trans World Airlines, Western Airlines.

REA **REA AIR EXPRESS. We're Fighting Back.**

REA Air Express
Marketing and Sales Department
219 East 42nd Street
New York, New York 10017

Please send me ( ) copies of your new Air Express cost-cutting tariff.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

Average number of shipments per week/month _____

Commodity shipped _____

Editorials

Not So Fast, Everyman

At first glance, the IBM 5100 portable computer is a step toward giving every small user his own processing power on the top of a desk [CW, Sept. 17].

But the device is too specialized to be known as Everyman's miniframe. This is actually a custom-tailored, problem-solving system best suited for complex environments.

The software initially announced with the 5100 covers such areas as economic analysis, statistics and mathematics functions. Certainly these capabilities are way beyond the needs of a small Cobol business user.

The features of the 5100 are comparable to those available for some time from firms such as Wang and Hewlett-Packard and known as programmable calculators. And, as might be expected, IBM has issued a Cadillac-priced model that is much more expensive than other similar devices.

IBM has clearly avoided any impact of the 5100 on the small business user. For the time being, he has to be content with the System/32 if he is looking to IBM for an entry-level machine.

Only Time Will Tell

The Info 75 show in New York this month may have proved the industry is not yet ready to return to the golden days of the '60s when the Spring and Fall Joint Computer Conferences drew huge crowds to Atlantic City and Las Vegas.

The comparison with an American Federation of Information Processing Societies (Afips) show was inevitable and the much smaller size made Info look more like a regional show than one which is national in scope.

Perhaps these ideas are too negative for a show that is only two years old, however. Maybe a maturity cycle is required before a computer conference reaches national attention and stature.

But in the hard-facts department, the Info 75 attendance was off from '74 by about 600, with final attendance at about 11,300. Booths rented by exhibitors were also down from last year.

On the plus side, the show was geared to provide technical sessions which concentrated on the user's point of view and stressed operational experiences. This type of technical program should be more attractive to users than the more esoteric gathering in which researchers talk to academic types about problems far removed from the real world.

There were some minor complaints from exhibitors about lack of job title on conference badges, and some attendees at the technical sessions were hard-pressed to keep up with last-minute room changes.

Next year, Info plans to go to Chicago in November. Maybe the week after Labor Day, just when the busy fall season is gearing up, is a bad time to wrench a user away from his office.

Whether we really need a second industry show each year is up to both attendees and exhibitors. Time will tell.

'What Do You Mean, This Is the GOOD News?'

Letters to the Editor

Interactive Programming Savings

No News to Decsystem-10 Users

As a user of a Decsystem-10, I was appropriately underwhelmed by Don Leavitt's article on the IBM 370/135 installation at Carolina Steel Corp. [CW, Sept. 10].

Once again, we witnessed the discovery of the benefits of interactive programming by a 370 shop. The element of news in this article was apparently that programmer productivity has doubled and response to user requests is tremendously improved.

This is not news! Decsystem-10 users have been enjoying these advantages for years. A truly newsworthy item would be that a Decsystem-10 had replaced the 370/135 at Carolina Steel, resulting in significant improvements in performance, throughput, programmer productivity and service to users, at a 30% reduction in cost.

Jim Post

McAllen, Texas

POS Systems Must Consider Users

If grocery stores persist in plans to not mark the items, they had better be ready for a lot of hassle and slowdown in check-out lines while the customer checks to see that he has been charged the proper amounts. The really significant points for grocery people to consider are:

- Shelf pricing isn't accurate today (for various reasons) and it will be even less accurate in the future.
- Itemized price lists won't work. Consumers can't effectively utilize them because they are not convenient and can't describe the product completely enough.
- Consumers in general are extremely wary of being "ripped off" by business due to the inflation of the last two years. They will see this as an excellent opportunity to be ripped off and will resist it strongly.

Les Pitstick

Dayton, Ohio

Stub Relationships the Issue

I am writing concerning the continuing hue and cry over structured programming in general and Edward G. Niles article, "Poor Program Modules Add Extra Layer of Obscurity" [CW, July 30] in particular.

First the use of "stubs" (anticipated black boxes) in top-down design is the computer analogy to span of control in business organizations. There are limits to the number of elements which can be directly controlled.

The issue is not the intrinsic simplicity of a particular element; it is the relationship of the element (stub) to other elements externally and internally.

Second, the suggestion by Niles that a module not call any other modules was patently absurd. Restated, it implied the driver module is not subject to the same philosophic constraints of other modules.

Obscuring the mainline's primary function of matching master records to transactions by including undifferentiated levels of subsequent decision making cannot help the recurring "first time, control break, last time" bugs which plague new development.

For any nontrivial application, following Niles' recommendation would result in 90% mainline (with innumerable GOTOs and compound nested IFs) followed by 10 to 20 modules handling from .2% to 1% of the code.

Jon C. Miller

Chicago, Ill.

Who's Herb Grosch, Anyway?

At age 10, I moved to a farm in rural Oregon. The new friends I cultivated during the summer constantly referred to the hero of the local grade school, Stinky Mildoon.

It was always, "Stinky said this" or "We'll have to check with Stinky on that subject." In the two months prior to school, I had built up an image of this elusive boy that would match any leader of the Free World.

I made one mistake, however, and that was to bring up the philosophy of Stinky Mildoon in an attempt to avoid punishment. My father, ignoring this new logic and philosophy, proceeded with the spanking I richly deserved, then asked me about this new hero of mine.

I expounded on my hero's words and philosophy, but soon realized I really knew nothing about this person which I could use to defend his supposedly superior thoughts and reason.

I learned that day to always inquire and review carefully the reference and credits of people who hold themselves up as experts or spokesman for any group or profession with which I'm associated.

Now my question is: "Who is Herb Grosh?"

Each week we, the loyal readers of *Computerworld*, are subject to the words of a man no one seems to know.

The column he wrote in the Sept. 10 issue left me in awe because it takes real talent to confuse one's readers to the point where they do not know whether one is writing about sex, mineral water, atomic war or computers.

I wonder — could Grosch be a grown-up Stinky Mildoon?

Jerry L. Poppenheimer

Phoenix, Ariz.

(Other letters on Page 16.)

To Run a Railroad

One of the technical tours which concluded the U.S.A.-Japan Computer Conference took attendees far into the Tokyo suburbs to the computer center of Japan National Railways (JNR). This is the company which leads the world in practical use of high-speed trains; we call them "bullet trains," the Japanese say "Shinkansen."

There were typically Japanese touches to the visit. First of all, we went by bus – the huge building is not on a railroad line! Second, the bus driver and tour guides got lost: it's easy, in Tokyo! So they asked a police patrol car, which then drove ahead of us through an assortment of *medina* alleys, narrow streets and divided highways (in seemingly random sequence) to our elusive destination.

We were met with slippers and shoehorns, hot towels – a magnificent custom – and iced tea. And a lecture, complete with interpreter. And a wonderful tour. We were all outfitted in nylon shop coats and peaked caps before being taken into the computer area; I was strongly impelled to take one of the latter as a souvenir, but refrained because I feared the ideographs on the hat probably said "Tokyo Linen Supply" rather than "Shinkansen."

JNR was mostly Nippon Electric communications gear. Besides literally hundreds of land lines into Kunitachi, the computer center "town," it operates two dedicated broadband microwave links to the main office in downtown Tokyo, one via the Eiffel-like Tokyo Tower, the other via the 50-story Keio Plaza hotel. One link carries all traffic, and the other is standby.

Power is similarly protected; JNR runs off two 66 KV feeders into two heavy motor-generator units, which are backed by two half-hour battery sets, which in turn are backed by a standby diesel system. The air conditioning is also protected, with five extractive units and three cooling towers. It intends to *operate*!

The computer rooms are heavily Hitachi, and Hitachi also cooperated in the very large software tasks involved in the "sales management" – that is, reservations – system. The communications control central has three processors and the file control central has three more; of each triad, one is up, one is ready and one is in maintenance or doing batch. The two centrals add up to 195 boxes: a very big shop indeed.

Passenger service constitutes 85% of JNR business, and computerization goes back to 1960, with a big jump to completely cover the reservation of the new bullet train capacity in 1964, five major extensions during the next decade, and the introduction of push-button telephone reservations early this year, in the Tokyo area only.

We had a demonstration of the audio response system. The customer keys in the special JNR number and gets a mechanical response which tells him to key in the number of the phone he is using (a recovery procedure). He is then told to key in a timetable label (one digit), the date wanted (four digits), the train number from the timetable (five), departure station code (four), destination (four), number of seats (one), class (one) and an end digit. Between each entry, the audio responder reads back what the computer received and coaches the customer on what comes next.

The computer then recites the reservation number (four digits) and makes the customer key it back in to prove he got it right. It then does the *arigato* bit and tells him to pick up the tickets at any Tokyo ticket counter by a specified date. When the customer appears and furnishes the reservation number, an automatic printer instantly produces the ticket. I have one – but it's for Sept. 31. No free samples!

What a way to run a railroad!

Oh, about size: the telephone system, a special group reservation system for tours (up to 980 people!) and the regular ticket office terminals handle 645,000 train seats per day. The system has a current capacity of a million seats per day and can handle, during the summer travel peak, 1.5 million inquiries per day. When reservations windows open at 9 a.m., inquiries sometime reach 130,000 per hour.

Doesn't remind one of the Penn Central, I tell you!

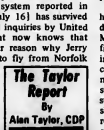
Herb Grosch

But Customers Suffer

Ignoring DP 'Hot Spots' Protects Airlines' Interests

The system "hot spot" in the United Airlines reservation system reported in this column [CW, July 16] has survived two presidential-level inquiries by United officials. Management now knows that there was no proper reason why Jerry Matlin's reservation to fly from Norfolk to Minneapolis was canceled and that this cancellation was not an accident, but part of routine systems action.

The Taylor Report
By
Alan Taylor, CDP



Yet, despite this, the practice has neither been stopped nor condemned. Both United Airlines President Richard Ferris, and Computer and Communications President Glen Belden seem to think everything has been satisfactorily explained. Which suggests there must be yet another, deeper hot spot existing in the United reservation systems design than just reservation cancellation methods.

The basic facts are no longer in dispute. Piedmont Airlines, without any authorization from Matlin, issued the cancellation instruction to United when Matlin did not show up for a flight from Raleigh to Norfolk. President Belden agreed totally with Matlin that such a "no show" is no reason to cancel later flights and certainly not flights that are eights days later, as this one was. Belden argued that even no shows which would apparently make it impossible for a passenger to catch an onward flight cannot properly be used to cancel reservations, in view of the possibilities presented by concurrent flights on other carriers or the fact the passenger may have gone on ahead earlier.

The Piedmont message, which should have been a simple report of a no show, did not claim to have originated from any Matlin authorization, although United at first claimed it had. It was in standard interairlines form, which omits this vital characteristic. United reservations personnel are aware of the practice of airlines such as Piedmont to automatically issue such unauthorized cancellations for no-show reasons. They are also aware that reported no shows can occur even though a passenger has in fact canceled his reservation and is not a no show at all. Despite this knowledge, United continues to accept these unauthorized "cancellation" messages at face value. This was and continues to be the system hot spot United has not addressed.

Appeasing Piedmont?

Or at least, United has not addressed this problem directly. The Ferris investigation of the Matlin situation does, however, constitute a possible step in the matter. Frank Dunham, writing at the request of Ferris to Matlin included, apparently gratuitously, the comment: "Our interairline computer friends (Piedmont, Delta, North Central, etc.) account for more seat bookings cancellations and changes than any other single business source outside our own company."

The meaning of the sentence is not clear. The cited interairline carriers are not a "single business source." But the thrust appears to be United is carrying out its reservations for the purpose of satisfying its business sources – rather than satisfying its contractual commitment to individual passengers. This commitment called for United to use its "best efforts" to carry Matlin from Norfolk to Minneapolis.

United, which has so far ignored this crucial question, has not claimed it is using its "best efforts."

Cause of Inquiry Failure

As a result, the question of what the system should do has been changed into an appeal for understanding that what it does do is in the interests of United Airlines – as that entity sees them. This change permits cases where accurate data processing is not seen as serving United to be swept under the rug, even though the system has ample information to handle the cases properly.

Piedmont and other airlines using similar procedures are certainly imposing an inconvenience penalty on no-show passengers. This they may feel is useful in its (Piedmont's) flight planning.

And United may be cooperating by enforcing the Piedmont-imposed discipline, so it will continue to get these valuable seat bookings from Piedmont. But this does not explain why United has flubbed both investigations. That seems to be a second, real hot spot all by itself.

Is Information Auditable?

As far as I can see, the second hot spot lies in the fact information – unlike accounting and engineering – cannot really be audited. An information error, except when it is simply reporting an accounting error or an engineering error, can be investigated to death without ever having to face up to the real problem. The Ferris investigation was handled by:

- Finger pointing at Piedmont.
- Agreeing with Matlin's observations and theories.
- Claiming interairline carriers were valuable business sources.
- Saying the information that passes between airlines is very reliable.
- Claiming the case was "a rare exception to the norm."
- Ignoring the Piedmont response.
- Ignoring the Matlin response.

The Belden investigation was equally irrelevant. It consisted of:

- Claiming Matlin personally initiated the cancellation.
- Admitting Piedmont policy initiated the cancellation.
- Admitting Matlin had no access to either United or Piedmont policy.
- Putting on a demonstration of the reservation system for no apparent, relevant reason.
- Asking for a Taylor Report clearing United Airlines.

All of which effectively ends up in a management dead end. There are still no out-of-balance items which would have occurred in an accounting system. Matlin can now be written off as a crank to be answered by lower and lower officials and eventually ignored...

This, then, is the new hot spot that can be seen in the United reservation system. Errors in the system, even when investigated by the highest authority, do not have to be faced up to, but can be ignored. There is no equivalent in this system of a boiler bursting – which was what put engineering design on the right path last century. Data processing is, and will apparently remain, an art, rather than a science. And yet it is being treated like the science that it is not.

Letters to the Editor

DP Layout Artist Needed To Check Changes on W-2s

Once again programmers around the U.S. are busily revamping computer programs to accommodate changes made to the W-2 forms.

By now one would think that the Internal Revenue Service would have received so much flack from previous revisions that this year's changes would be minimal. They are not.

I believe it is time for an industry spokesman like Herb Grosch to plead our case. Think of the many dollars spent each year by industry to make the changes, many of which appear to be unnecessary since they merely represent layout form changes.

Even then, the new format does not appear to have been designed or checked by a DP layout artist.

H. Richard Winkler
Cincinnati, Ohio

Sample Not Significant In Survey of Software

The July 2 issue of *Computerworld* carried a banner article entitled "Packages' Contents Rank Higher than Documentation." The article reported on a survey conducted in Paris by the French publication *Zero-Un Informatique.*

Zero-Un compared software packages which are vastly different in purpose, capability and extent. Comparing Librarian to Panvalet may be valid, but comparing Fast Dump/Restore to Mark IV is ludicrous.

The article pointed out that "the results should also be considered in light of the fact that the questions favored small products with sharply defined functions to the detriment of more ambitious packages." If the IBM IEFBR14 program were sold as a package by itself, it would have undoubtedly rated a clean 4.0 in all categories.

France has, at the current time, only 43 of the 900-plus world-wide installations of Mark IV. The U.S. and Canada, on the other hand, have over 626 installations. Polling the small French Mark IV-using population can hardly be considered statistically significant.

Edward E. Straub
President
Mark IV User Group
Canoga Park, Calif.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Dear Computerworld:

I (borrowed) (stole) (shared) (copied) this issue of *Computerworld*, and it made me:

- ☐ PROUD
- ☐ SKEPTICAL
- ☐ ANGRY
- ☐ PLEASED
- ☐ INVOLVED
- ☐ AWARE
- ☐ CURIOUS
- ☐ EXCITED
- ☐ DEMANDING
- ☐ FURIOUS
- ☐ INFORMED
- ☐ SURPRISED

☐ ALL OF THE ABOVE

☐ PLEASE ENTER MY SUBSCRIPTION (details on back)

☐ **I'm already a subscriber, but I'd like you to change my:**

- ☐ **address**
- ☐ **title**
- ☐ **industry**
- ☐ **other**

My current mailing label is attached and I've filled in new information on the other side.

Note:
Please fill out form on back, detach and insert in post-paid envelope attached through binding.
Thank you.

COMPUTERWORLD

Please ... COMPUTERWORLD

RATES: U.S. - $12 Canada and PUAS - $20 Other foreign - $36

If charge we must have cardholder's signature

First Initial	Middle Initial	Surname	
Your Title			
Company Name			
Send to: Address			
City		State	Zip Code

Address shown is
- ☐ Business
- ☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

CIRCULATION

Detach here, fold, and place in post-paid envelope attached through binding.

10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/ Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/ Other Communication Service
95 Other _____

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other _____

Data Base Systems Found Across Wide Range of CPUs

•IDMS, on 370

DEDHAM, Mass. – For the last few years, full-service banks have been pursuing data processing techniques which allow all of the accounts of a customer to be viewed and processed at one time.

Data base management systems provide the logical data relationships needed to accomplish this task and also provide the direct access to data needed for on-line systems.

The Norfolk County Trust Co. (NCTC), based here, is about to put such a system into production, according to Vice-President A. Neill Osgood Jr. Tabbed the All-Purpose Bank Plan (APBP), the system consolidates information about checking accounts, savings accounts, 90-day notice savings, reserve credit and Master Charge. Other types of accounts will be added to the data base later.

NCTC has carried the design one step further than usual in that all of the customer's accounts have the same account number. From any single account, each related account for the customer is easily determined and located.

The system is written in Cobol using structured programming techniques to ease program maintenance and allow new additions for bank processing needs and greater customer service capability.

At the core of the system is IDMS from Cullinane Corp., selected after a lengthy study of available data base packages by NCTC, with considerable assistance from a consulting organization.

High on the list of selection criteria were data independence, Codasyl compatibility, full network data structures and the ability of the data base to grow in size and scope without reloading or reprogramming.

Since the bank has a relatively small staff, the minimal system programming requirements of IDMS and Cullinane's reputation for customer support were the clinchers, the firm said.

Machine Resource Requirements

A major concern in the design of the system was the machine resource requirements. Compared with the old system, which was written in BAL with independent sequential disk files, the design, which included the generality and flexibility of IDMS along with Cobol and structured programming, was expected to be minimally slower in execution and higher in main memory and I/O requirements on the bank's 370/145.

The only fear that materialized somewhat was the main memory requirement, which increased from about 50K bytes to approximately 120K bytes for the largest programs. Inspection of old and new programs has resulted in the feeling that the additional overhead for Cobol and IDMS was more than offset by ease of program maintenance, program isolation from data base change and the other expected advantages of data base management.

System testing has shown the system is no more costly to run on a daily cycle or statement basis than the old.

The daily cycle begins with the APBP transactions being received and stored throughout the day as part of the 200,000 to 250,000 transactions which NCTC processes each 24 hours. From this composite file, the approximately 60,000 transactions belonging to the current APBP data base system are selected out, sorted, edited and written to a sequential disk file for use by the subsequent posting run. This step takes about 25 minutes.

Application programs then process these transactions against the approximately 70,000 APBP accounts in the data base, performing all maintenance and dollar activity concurrently for all customer account relationships. The run includes the printing of a complete, detailed trial balance for each branch and takes 90 minutes with no printer spooling.

Major features of this posting run are daily updates of the name and address information, which used to be weekly; the generation of daily current and consolidated information for anticipated online use; and the substantially lower I/O activity due to the direct access and physical sequential record organizations within IDMS.

The next major step in the daily processing is a report run to produce more than 30 reports such as exceptions, overdrafts and the like for bank management, auditing and operating use.

(Continued on Page 18)

•DRS, From Mini to Mainframe

By Linda Gardner
Special to Computerworld

NEW YORK – Answering questions about the social services provided to 8 million New Yorkers is made easier for the Office of Information & Referral Manuals (Irma) by using the Data Retrieval System (DRS) from Aeronautical Research Associates of Princeton, N.J. (Arap).

Irma manages New York's computerized inventory of government and voluntary agencies offering services to the public. Irma serves the referral and planning needs of the helping agencies of New York by providing computer-generated reports and directories containing current services information.

Irma's citywide data base of approximately 1-1/2 million characters has 6,000 records, each containing over 50 numeric and text fields of facility information describing 15,000 services. Major linkages are provided by service and eligibility descriptors, an administering agency structure and geographic locators. Three supporting data bases, totaling 14,000 records, facilitate the processing of secondary sources (printed directories, other computerized files, etc.) as well as the development and maintenance of Irma's controlled services vocabulary. Currently Irma data bases are undergoing redesign to take full advantage of DRS's hierarchical capabilities supporting multiple record types and networking linkages among record types for one base.

Ease of Use

Four years ago, DRS was selected primarily for its ease of use; text editing features; complex string manipulation capabilities during data selection, arrangement and formatting; and its low cost.

Irma also required a system that was easily machine transferable – DRS provided it. Developed on Arap's own Digital Scientific Meta-4 minicomputer emulating an IBM 1130, DRS is available on both small and large computers and timesharing systems. Irma's first microfiche directory was produced using the 1130 version in June 1973. For the past two years Irma has used DRS on an IBM 370/145 using both VM/CMS and OS/VS1 for directory production, maintenance and program development.

Starting this fall, Irma production jobs will use DRS at another New York City installation on an IBM 370/158 using OS/VS2. In every case, changes in hardware and operating systems have been transparent to Irma staff, requiring no alteration of Irma DRS procedures.

Generalized System

DRS is a generalized information retrieval system providing data base management. There are over 60 commands available to allow data maintenance, selection, field redefinition, arranging, statistical processing, listing and report formatting. Two areas of specific Irma applications, data entry and directory production illustrate the scope and flexibility Irma has enjoyed with DRS.

Irma receives information from many sources such as mail verifications (with DRS-produced mail labels), telephone, other directories, newspapers and other clippings, government liaisons and cooperative collection efforts with other agency staff. Effective management of this collection network demands control and text editing capabilities with minimal additional encoding requirements.

Irma maintains control data describing source and data for fields affected by given transactions using the DRS LINK feature which enables the more program-

(Continued on Page 22)

•Image, on HP

Special to Computerworld

DENVER – A minicomputer, combined with a data base management system, has enabled the city and county of Denver's Manpower Administration to retrieve information almost instantaneously, instead of days or sometimes weeks later, while reducing its programming load more than 50%.

Funded by the Department of Labor, the Law Enforcement Assistance Act (LEAA) and local funds under a federal revenue-sharing program, the municipal agency finds jobs, arranges on-the-job training and provides vocational education to raise job skills for disadvantaged and low-income men and women. The LEAA budget contribution stems from the acute need for job training for ex-offenders to preclude their return to prison.

The administration's data bases include information pertaining to more than 12,000 individuals contacting the agency annually plus cooperating empoyers, subcontractors and the agency's employees.

A Hewlett-Packard 2100 with 32K core memory, using HP's disk-based Image/Query data base software, was set up last November to replace a card-oriented IBM 1130.

One Timers

"Many of our programs are one timers," according to Lou Stover, the administration's director of management information systems. "A manager may need to know quickly the number of females registered with the agency who are heads of households and with two dependents," she explained.

By accessing the data base in simple English statements, QUERY retrieves such information in a matter of minutes. Within 10 lines of QUERY procedure statements, output also may be formatted under specified columnar headings on the agency's 200 line/min matrix printer.

In the event a user expects the listing to be of future use, it can be labeled, stored on disk, retrieved for maintenance or invoked for production use by requesting the report name.

"With the management information system, we now have one major file for all planners. The programmer does not create overlapping files of duplicate data. And all data balances," Stover said.

Enhancing the agency's ability to perform exploratory inquiries is the system's sorting capability. On an unscheduled basis, the Department of Labor, for example, requests lists of individuals participating in one of the agency's training programs of working for a cooperating employer. The lists are used to cross

(Continued on Page 18)

370-Based IDMS Drives Bank Service

(Continued from Page 17)

The final daily step is to merge the 60,000 transactions into the transaction history area of the data base. Approximately 1 million transaction history records are present in the data base at any one time.

The records are organized physically sequentially by account number in their own area and each tied to the appropriate master account record by an IDMS set relationship. As a result, the account number is not even carried in the transaction history records, which results in considerable disk space savings. This run requires less than one hour.

Statement runs are made four times a month. All the APBP accounts for a customer are summarized in the heading of a single statement, and the complete detail follows the summarization. Approximately 17,500 accounts are stated in each run. As the detail is printed, the postings are essentially recalculated and checked against the account master information for verification. As the statements are prepared, the detailed transaction history for each customer stated is deleted from the data base so a new log for the next statement period may begin. Interim statements can also be produced easily for the first time.

NCTC prints its statements two up. Any statement may consist of multiple pages, and these pages must be printed vertically so that Page two follows Page one when the stack is split and decollated. A program prepares one-half of the statements in print image form and writes them to tape by following a special IDMS set for a specific statement cycle.

A second program then reads the tape writing those statements to the left side of the two-up form and simultaneously reads the remaining half of the statement cycle set in writing statements to the right side.

The direct access, physical sequential placement and set relationships within IDMS offer a somewhat novel opportunity which is not currently being used at NCTC. IDMS allows a logical area to be split into sectors and placed on several files if desired.

A program could begin printing statements for accounts from the right side of the transaction history area on the left side of the two-up form and simultaneously print statements for accounts starting in the middle of the area on the right side of the form.

To avoid excessive disk arm movement in alternating from an account for the left side and an account for the right side of the form, the data area could be split in half and each half placed on a file, with each file on a separate pack. A separate read head is then available for each of the two sectors of the area and each head would move serially across the sector, producing a highly efficient run.

HP's Image Aids Denver Agency

(Continued from Page 17)

check with similar lists revealing individuals receiving unemployment compensation from the state of Colorado. The lists may be printed in Social Security number order or by name of individual. Thus any illegal payments may be quickly discovered.

Prior to installing the HP system, information requests were specially programmed. As a result, the systems analyst spent most of his time helping the agency's programmer. "About 65% of my time was spent putting out programming fires," Stover said.

Now only one programmer is required, who can devote uninterrupted time to repeat programs; the systems analyst is seldom involved in programming; and Stover finally has time to manage the system and plan for future requirements that may be placed upon the agency.

Birth Problems Minor

Birth problems of the system were relatively minor, Stover said. However, she emphasized as mandatory an understanding top management. "Three of us literally took four months off to build the data base."

The first step was an extensive series of meetings called by a Manpower administrator, Joe Lambrecht. After introspective discussion, various managers sharpened their focus on what information was essential in a common data base to realize their objectives.

Subsequently DP personnel built a data base that met the need of responsiveness to management's required information.

Data sets within the Client Data Base include demographics of disadvantaged individuals, transactions, follow-up information (after job placement), agency employees involved with individual cases and subcontractors (private, nonprofit training schools). Other data bases pertain to fiscal information, the agency's summer youth program and cooperating employers.

To Remain In-House

The HP system was selected vs. other alternatives such as time-sharing primarily because of the perceived need to remain an in-house operation; the availability of a data base system with a minicomputer and its costs.

The 32K system with its four 20-M byte disks, paper tape reader, magnetic tape drives, line printer, mark sense card reader, a video display console and the Image/Query software cost the agency a monthly rental equivalent of $1,400, slightly less than the total monthly rental of the far less capable, card-oriented computer and a required keypunch and sorter it replaced.

ACM Offers Meeting Papers On Structured Programming

NEW YORK – The proceedings of the Codasyl "Symposium on Structured Programming in Cobol – Future and Present" have been published by the Association for Computing Machinery (ACM). The symposium, sponsored by Codasyl's Programming Languages Committee last April included 14 papers in which the authors described working experiences with structured programming techniques using Cobol.

The 280-page proceedings were edited by Henry P. Stevenson of Bell Laboratories, Inc. and can be ordered from the ACM Order Department, P.O. Box 12105, Church St. Station, 10249.

Prices, prepaid, are $10 for ACM members and $15 for nonmembers.

Choice of First DBMS Project Vital But Tricky Chore

By William Casey
Special to Computerworld

After any data base management system (DBMS) package has been brought in-house, one of the more critical decisions to be made has to do with the nature and scope of the first data base projects.

Concepts and Techniques

In most instances, management knows generally which application area or areas are to be attacked, but within that overall plan there are many specifics that have to be worked out. This definitional process is frequently turned over to the data base administrative staff.

The staff's systems analysis work will determine the exact bounds of what is to be done and the stages in which it is to be accomplished. By approaching and executing the job which faces it with a proper degree of caution and an understanding of what is expected of it, accurate results can be achieved without slippage in time schedule.

Before this scope-defining process takes place, the data base administrator should be aware of two factors which are going to be present independent of all other considerations.

First, nuances and special design/performance variables are inherent in any DBMS. These are going to take time to recognize and take into account and can result in a certain degree of reanalysis or redesign.

This "foible factor" can be reduced and, in some instances, eliminated if design talent familiar with the package is already present on-site and/or vendor assistance is high.

Learning Curves

The second factor – programming and analysis learning curves – focuses not on the attributes of a particular DBMS but rather on the fact that any newly acquired skill becomes more dependable and easily applied the more an individual practices it.

If more than a few persons are going to be programming data base-oriented applications, the chances are reduction or elimination of this factor will be unlikely. There is, however, a marked variance in eventual ease of use between packages. Therefore, persistence of the learning curve problem six months, a year or two years hence is something that should well be taken into account.

For this reason, conversions are often convenient ways to experience the learning-curve process. Before new design and programming ground is broken, staff members attain a working knowledge of the DBMS while still accomplishing something useful.

Of course, to do a convension, there has to be something to convert which is *worth* converting. Sometimes folks forget this.

Smaller Design Quirks

Given the above two factors with which the data base administrator must deal – package foibles and programming learning curves – it is easy to say that the optimum choice of scope focuses around smaller, noncritical aspects of the data base project. The problem with this seemingly attractive recommendation, however, is it is hard to find much in any project which is truly "noncritical." As a result, analysis and programming must in most cases be under way in earnest for some time before many of the smaller design quirks are known and programmers feel familiar with their new environment.

Based on my experience, it seems many successful data base management projects owe their results to the proper combination of two elements: long-term system scope and short-term accomplishment. While a certain percentage of DP installations appears to overdo the system analysis phase (they pass papers and other specifications around to one another in a seemingly unending loop), the more typical problems result from insufficient or inaccurate initial planning and design.

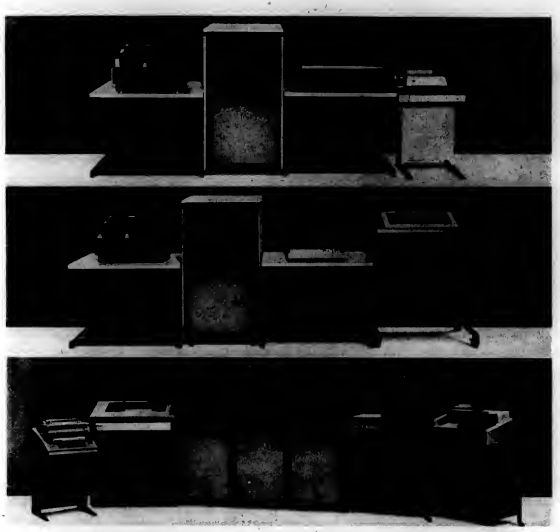
Combining adequate design procedures and safeguards and at the same time allowing for closely spaced but meaningful project milestones is a genuine challenge.

Stepping-Stone Approach

The distinction between these two ingredients must be established clearly. The stepping-stone or building block approach is important: parts of the overall project are specified in such a way that small portions of it become operational in defined stages. This technique permits assessment by management in preestablished discrete time frames and permits end users the wonderful thrill of legitimate system output before the entire project is on the air.

For the technical staff, the effect is equally salutary. They feel a deserved sense of accomplishment by seeing the "fruits" of their labor and experience a feeling of relief as the "all or none" atmosphere of a single deadline large project has been

(Continued on Page 22)



ONLY ALL OF THE ABOVE CAN OFFER ALL OF THE BELOW:

General Automation's new family of low-cost, expandable remote batch terminals offer more capabilities than any competitive systems produced by any terminal or minicomputer manufacturer anywhere.

Here's what we mean by *capabilities:*

Talk to any computer.

Our software emulator packages make our terminals multi-lingual. They can talk to IBM 360/370 HASP or 2780 work stations. They'll also emulate a Control Data User Terminal. Or a UNIVAC 1004 system.

Data spooling included.

Our disk-based emulator packages have data spooling. Which saves you transmission time. Which saves you money.

More operating systems.

Most RBTs have one or two operating systems. Ours have three: Including Free Standing (FSOS), Disk-Based (DBOS) and Real Time (RTOS) operating systems.

Name your configuration.

We can provide any hardware configuration, including any kind of peripheral equipment you could ask for. Our RBT family consists of three basic communications systems (base prices range from $19,500 to $30,000):

RBT-1 is an intelligent batch communications terminal used for entering, transmitting and receiving data between a remote location and a central computer.

RBT-2 combines communications terminal capabilities with a batch-oriented satellite data processing system.

RBT-3 is a complete communications system plus multi-programming-oriented stand-alone data processing system offering concurrent batch and real-time operations.

Communicate with an expert.

General Automation didn't get into the communications business yesterday. We are already the major supplier of minicomputer systems for front end processors, distributed data systems, Telex message switching systems and PABX control systems for the world's largest international communications companies. We're also the number one solver of tough communications problems in more than a dozen different industries.

We provide virtually everything you need to build or expand a data communications system. We can show you the best ways to get the most out of your communications dollar.

Give us a call at (714) 778-4800. Or write to one of the addresses below.

COMMUNICATIONS SYSTEMS BY GENERAL AUTOMATION

HOME OFFICE: 1055 South East Street, P.O. Box 4883, Anaheim, California 92803. Telephone (714) 778-4800.
EUROPE: General Automation, S.A., 24 rue du Sergent Bauchat, 75012 Paris, France. Telephone (1) 346/7973. CANADA: G.A. Computer Ltd., Ontario.

No Need for In-House DBMS

American Honda Uses Remote-Computing Net for IMS

GARDENA, Calif. – American Honda, the U.S. distributor of Honda cars, motorcycles, power products and related accessories, cut five days off the time required to place parts shipments from Japan into stock by switching from a manual tub file system of managing its reserve inventory to an on-line data base management system (DBMS) at a remote-computing service company.

The application programs in the system were developed by McDonnell Douglas Automation Co. (McAuto) and operate under control of IBM's Information Management System (IMS) on a battery of 370/168 computers at McAuto's West Coast center in Long Beach, Calif.

At regional parts centers here and in Moorestown, N.J., American Honda employees use IBM 3270 CRT terminals to access their data bases over a single multidrop line for lower communications costs.

The need for a DBMS at American Honda is better understood by examining the big distributor's operation.

The warehouses are divided into primary storage and reserve storage. Primary storage areas contain picking bins into which fast-moving parts are placed for speedy filling of customer orders. The reserve storage areas are for slower-moving items and for surplus stock of fast-moving parts.

Identifies Location

The software system used helps move merchandise from reserve inventory into primary inventory by identifying – at the time shipments are received – the precise storage location of all reserve inventory items.

These parts arrive in the U.S. from Japan by both ship and plane. The arrival of sea shipments is preceded by a tape file from Japan listing all the parts in the shipment by carton number. This tape is loaded into the American Honda data base on McAuto's 370/168 using a batch loader specially designed for this application.

Air shipments, which are more frequent but smaller than sea shipments, are accompanied by invoices which are keyed into the data base.

After the data bases have been loaded, the parts lists are immediately available to American Honda warehouse employees on their 3270 CRT terminals.

When a shipment arrives at the receiving docks, workers using telephone head sets inform the CRT terminal operators in a bay or loft area overlooking the receiving line what cartons are before them.

At the terminals, the operators display a screen of some 50 items from the arriving shipment's previously stored data base. As each box number is called out to the operator, he touches his light pen to that item. When all items on the screen have been checked off, the operator depresses the "enter" key, and that screen full of data is transferred into a master reserve inventory data base that assigns part numbers to specific warehouse locations. This operation continues until the entire shipment has been inspected and placed into the data base of reserve inventory.

Earphones and light pen aid checking of American Honda supplies.

At the same time, another sequence of events is occurring. As soon as new items have entered the master reserve inventory data base, the system checks another computer file for possible outstanding requests from the prime warehouse for any of the newly arrived parts. Outstanding requests for parts cause the computer-assigned storage location to be changed.

Printers in the warehouses, connected on-line to McAuto's computers, begin printing out "move" information on labels. These labels, affixed to the newly received cartons by warehouse runners, direct the cartons to their designated storage areas in either the reserve warehouse or the primary warehouse.

Following the warehouse stocking sessions, the master reserve inventory data base is retained on disk at McAuto's data center for daily use by American Honda in moving parts from reserve storage into primary storage. When pickers in primary storage notice that certain bins are either empty or too low to fill an order, they inform a CRT terminal operator in the parts manager's office who enters a request into the system for those parts.

After each shipment of parts has been stored and McAuto has produced a new master data base of reserve inventory, McAuto writes this inventory to tape and supplies it to American Honda's own 370/158 for updating the overall inventory records that feed an order entry system. Through this technique, American Honda dealers know quickly if parts are available in U.S. warehouses to fill customer orders.

DRS Machine Change Unknown by Users

(Continued from Page 17)

ming-oriented user to write special-purpose modules to perform tasks related to a data bank and then return to DRS. In addition, the DRS PASSWORD command enables Irma to differentiate access by other agencies to data bases, records, fields and specific commands.

Editing Data

Most Irma reports are used by other agencies; thus data must be carefully edited for clarity and ease of use by non-Irma staff. Irma relies heavily upon DRS for massaging and editing data.

Normal DRS error checking identifies data conflicting with the input specifications supplied DRS by Irma at the time of data base generation. Additional DRS procedures select and generate listings of records missing critical data for further research.

Editing Irma's often lengthy text fields used in service descriptions uses an Arap-supplied link module which enables Irma to modify all or part of a field on one or an entire group of selected records. A key feature of this link module is that only the relevant character string is reencoded.

Conversion of Irma facility files to a hierarchically structured DRS base will also reduce encoding for data entry and editing from that now required for lengthy text fields entered multiple times to that required for encoding the few fields used by DRS for maintenance of the pointers.

In addition, the style guide used by Irma and other agency staff doing research and editing is maintained by analysis of reports generated with the NUMBER command listing the frequency of text patterns contained in key text fields.

Must Meet Public's Needs

Equally important, report production must accommodate the needs of both the pubic and Irma staff. In-house working lists and data "dumps" used in file maintenance are produced regularly.

Special reports, both list and statistical in nature for researchers and planners, are produced in reaction to more immediate, often one-time-only needs.

Irma has produced over 50 hard-copy and microfiche directory sets containing services information.

The Key Word Out of Context (Kwoc) index demonstrates the complex manipulations handled by DRS during the production of an Irma directory or index. The Kwoc index enables the directory user to access facilities and programs by service key words.

An ARRANGE command parses the "words" (defined by Irma at run time, a "word" is a character string delimited by blanks or any punctuation) contained in six relevant descriptive name fields. These words are arranged in alphabetical order eliminating duplicates generated from the same record. Other unwanted words are eliminated by use of a noiseword table constructed by Irma staff prior to production with the aid of a DRS-generated listing of word frequencies. Next the selected record set arranged in word order passes through a general-purpose link module output formatter (LMOT).

Formatting Language

LMOT is the generalized formatting language Irma uses for all of its directory production and complex formatting jobs. LMOT is a set of link modules accessed through DRS with over 50 operators for controlling output content and form.

Irma can also insert control characters used in automatic photocomposition as well as interfacing with microform generators.

Gardner is systems manager at Irma in New York City.

First DBMS Project Choice Seen Hard

(Continued from Page 19)

replaced by a more paced ambience. In addition, gross miscalculations regarding system performance or use can be detected and adjusted early, hopefully before results have a wider effect.

The stress on definable modules of system and data base accomplishment should always be coupled with a strong overall emphasis on intelligent and long-range system design. While most DBMS packages "forgive" the user in varying degrees for design or analysis errors, these features should never become an excuse for lack of system investment.

Never Wasted Time

In my own experience, I have never seen a single instance where good solid systems work – an attempt to understand and define in the beginning where and how things are going in the long run – has been time wasted. A few additional man-weeks of effort on the "front end" of a long and eventually complex data base management project can give all concerned a better idea of overall shape and direction.

The single watchword which applies to both ends is "caution." Realistic deadlines for project phases, careful analysis as well as future system functions and sufficient design room for error are all assets as the project goes from stage to stage. As in any other business environment, data processing is measured by its performance: its ability to generate a product on time and according to specification. The cautious approach may not be as flashy a one as employing many high promises to users at the beginning, but the good will and confidence which eventually results when systems work and deadlines are met is a solid asset upon which much can be built.

Casey is vice-president of Cullinane Corp. in Wellesley, Mass.

Codex Processors Provide Net Control

NEWTON, Mass. – Codex Corp. has introduced what it described as a new class of data network products, the 6030 and 6040 intelligent network processors. The units are said to combine the best features of concentrators and multiplexers at relatively low cost.

The 6000 series is described as a modular family of compatible data communications processors to implement a range of computer communications networks. The series includes an expandable multiple-microprocessor architecture and an advanced firmware-resident internal protocol to implement these features:

- Replacement of existing communications facilities by network processors is said to be invisible to both computers and terminals. No software changes, modification of protocols or hardware engineering by the user or host supplier is necessary, Codex said.
- Line costs are described as reduced through the use of statistical multiplexing, data compression and a protocol which gives "unprecedented throughput efficiency." Node-to-node delay is typically less than that obtained with conventional time division multiplexers, the company said.
- Data is protected from errors end-to-end by what is said to be a sophisticated integral ARQ technique. Rerouting of traffic around failed links is achieved by alternate and dynamic routing capabilities. Equipment outages are minimized by modular and redundant hardware design and software diagnostics, the firm said.
- From a central site the user or host computer can monitor conditions throughout the network, initiate diagnostic routines and reconfigure network characteristics with the 6030 or 6040. Such network parameters as terminal error rates, processor loading buffer utilization, data compression efficiency, line utilization and others can be measured and reported on the optional operator's console, Codex said.
- The network processors can be configured to span application requirements from simple point-to-point systems on up to large, complex networks having numerous nodal points.

Other Features

Features including autospeed, autoecho, computer port contention, customized data compression, data security, synchronous and asynchronous terminal intermixing and compatibility with the Codex 900 series of time division multiplexers (TDM) are available on the 6000 series.

The initial 6030 and 6040 are available either in table-top or rack-mounted configurations. The 6030 can accommodate up to 124 terminal ports with a throughput rate of 19.2K bit/sec. The 6030 supports options that include network management, data compression, performance monitoring, BSC terminals, synchronous and asynchronous terminals, autospeed, autoecho, an operator console and a control terminal interface.

The 6040 model can be expanded to accommodate up to 252 ports, and system throughput can be up to 56K bit/sec. Multimode configurations, Codex 900 TDM interface, automatic channel assignment and data security are the options offered on the 6040, in addition to all 6030 options.

First deliveries of the 6030 are planned for January. A typical system composed of 28 ports would be priced at approximately $12,500 or leased at $420/mo. The 6040 will be available next spring. Codex is at 15 Riverdale Ave., 02195.

Telenet, Tymshare Compete for Users' Data Packets

By Ronald A. Frank
Of the CW Staff

PALO ALTO, Calif. – Now that Telenet Communications Corp. has begun to provide packet-switched service to users, new attention is being focused on a similar service from Tymshare, Inc.

Tymshare's Tymnet packet-switched network went into nationwide operation about three years ago and is now operating through about 112 nodes or access points.

Comparisons between Telenet and Tymnet are difficult because Telenet is a regulated carrier with published tariffs while Tymnet is nonregulated and Tymshare provides the service under contract with customers.

One of the often-quoted advantages of packet-switched services is the user pays only for the data that is actually transmitted on the network. This concept holds true for long-haul intercity charges where transmission costs do not begin until the user has sent data from his terminal to the nearest network node processor. Network costs are based on the amount of data actually sent between network processors.

But users have to find a way to access the nearest processor. If they use a dial-up line, costs begin when they make the connection to the nearest node, or they may use a phone company private line at a fixed monthly charge.

In either case, the cost of the access line will be based on the distance to the nearest network node. And with 112 nodes already operating, this seems to give Tymshare an advantage over Telenet which initially is serving nodes in seven cities.

Costs of interactive services on Tymnet are about 15% to 20% higher at low speeds than costs charged by Telenet, according to Warren Prince, vice-president for the Data Services Division at Tymshare. But the greater availability of nodes, especially in populated metropolitan areas, means users will probably pay less for access line costs, he said. This advantage will decrease as Telenet brings up more nodes in key areas.

A primary example of the Tymnet advantage in shorter access lines occurs in Los Angeles, Prince said. Tymnet has nodes in the San Fernando Valley, El Segundo, downtown Los Angeles, Orange County and Riverside. These nodes can be reached for relatively low costs by nearby users. But a call from Orange County to the Telenet processor in downtown Los Angeles could cost as much as $7/hour in long-distance charges, Prince said.

It is very hard to estimate what the Telenet service will cost for interactive applications, Prince said. The price will vary according to the number of characters per packet, and this in turn is dependent on the speed with which the user enters data into his terminal.

If only one character gets into a packet, the Telenet cost could be as high as $14/hour, Prince estimated. A recent cost estimate of $2.28/hour on Telenet was based on about 15 characters per packet. Another consideration, in addition to cost, is that the larger the number of characters in a packet, the worse the response time is going to be, he said.

Based on Tymshare's experience, the average characters transmitted through the Tymnet network for low-speed terminals runs between five- and six char./sec, Prince said.

In interactive operation, since there is no convenient record length such as a card with which to structure a packet, there must be some rules within the node processor on when to construct a packet from the data the user has loaded into the buffer.

One of the big differences between a Telenet packet and a Tymnet packet is the first can be sent to only one destination while on Tymnet the packets can be sent to multidestinations, Prince said. This means the packet being sent out from the Tymnet CPU on the West Coast can contain answers to inquiries of several network users instead of answering each inquiry with a separate packet.

In the long run, Prince said Telenet will provide a service more suited to the remote-batch user while Tymnet will have better operating characteristics for the interactive user. Despite this fact, Telenet is initially offering only interactive service with remote batch to come later. And Tymnet is making plans to upgrade many of its nodes with larger processors so it can get into the remote-batch area, he said.

Datapoint Adds Hasp Feature

SAN ANTONIO, Texas – Datapoint Corp. has an enhancement to its multiterminal Datashare system that will permit concurrent Hasp workstation batch processing. The program, partition supervisor (LPS), operates under the standard DOS.B operating system and utilizes the Datapoint 5500 advanced business processor with disk units.

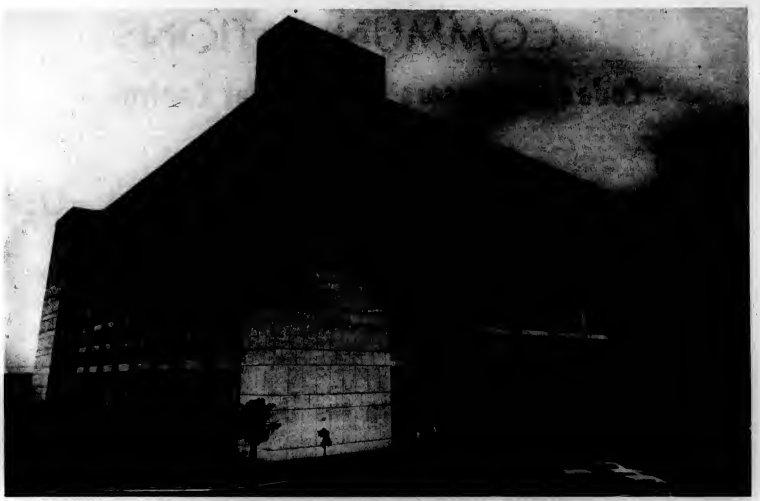
The software allows Datashare users to run non-Datashare programs in an interactive batch mode while the system is in use for other applications. Eligible programs include the majority of DOS.B utility routines, a Hasp 360/20 communications package and all Datapoint-supported languages including RPG-II, Basic and Scribe.

Up to 16 users with video terminals can access a Datashare processor and disk files. Each terminal operates independently and is provided with a 32K virtual memory space in which to run software for data entry or processing. All files may be shared among terminals and are controlled through the central processor.

At present, the enhanced system will run the Hasp 360/20 communications emulator package, and other communications packages will be added.

To run the concurrent processing system, a 5500 CPU with 48K of memory is required along with the two 20-million character mass storage disks.

The program is available for documentation charges only, along with a system manual, from 9725 Datapoint Drive, 78284.



Shell's Information Center in Houston. Some of the country's best-trained systems people study here.

How to get the same systems training Shell gives major corporations, universities, and government agencies.

We have been training our computer and systems people for the past eight years with one target: Develop working proficiency. Now you can buy the same training for $90 a day. And here are five reasons why you'll want to.

1. You can acquire immediate working skill for your lead people quickly and effectively.

2. You can learn to work with new software technology in an experienced, operational environment. We operate IMS, TSO, MARK IV, IBM Interactive Training System, ADABAS, and other major software.

3. You'll learn from full-time instructors who have usually developed the course they're teaching. This makes a big difference in instruction quality.

4. You'll learn in small classes of about fifteen students. A small enough group for individual instruction, but big enough for lively class debate and dialogue.

5. You'll have hands-on experience with a major computer facility, writing code and executing with instructor assistance through the whole process.

Over 40 companies, universities, medical schools, government agencies, and hospitals have joined our classes in the first year of public training. Students are coming from the U.S., Canada, South America, and the Middle East.

Act today. Send for our free booklet. It outlines all of our courses. Then call Diane Gallagher (713) 795-2754 to register.

Shell Oil Company Information Center
Ms. Diane Gallagher, Rm 7W07
P.O. Box 20329
Houston, Texas 77025

Yes, I'd like to know more. Please send me your free 38-page booklet which includes full details about data processing education. The courses. The prerequisites. The cost and a current class schedule.

SHELL

My name _____

My title _____

Company name _____

Address _____

City _____ State _____ Zip _____

Memorex 1380 Net Processor Can Replace IBM 270X, 370X

SANTA CLARA, Calif. – Memorex Corp. has introduced a programmable communications processor called the Model 1380.

The 1380 is described as a functional replacement for the IBM 270X and 370X communications controllers, attaching directly to an IBM 360 (Models 30 and above) byte multiplexer channel and/or to a 370 (Models 135 and above) selector, byte or block multiplexer channel. The processor is about 10% to 15% less expensive than a 3705, a spokesman said.

Advanced hardware and software are said to allow the 1380 to provide eight times the throughput of the 3705, offering an aggregate data rate of 100 kbyte/sec. This is the highest data rate of any currently available communications processor in the IBM market, Memorex said.

Because of the 1380's diagnostic and dynamic line-switching capabilities, it reportedly outperforms the 3704/3705 communications processors in network control. The processor offers expansion capabilities and feature enhancements not available with the IBM 270X, 370X or integrated communications adapter such as expandable MOS memory and supports a wider variety of non-IBM terminals, the firm said.

Net Management Functions

Network management functions on the 1380 include dynamic line control, line statistics reporting, line monitoring and down-line diagnostics via an operator CRT console.

The 1380 attaches up to 240 asynchronous lines. It handles asynchronous (start/stop), binary synchronous communication (BSC) and Synchronous Data Link Control (SDLC) lines with line speeds ranging from 110 bit/sec to 230,400 bit/sec in any mix of line speeds, terminals and communications disciplines.

The 1380 has a throughput capacity in excess of 100,000 character/sec for BSC operations and can service as many as four System 360/370 central processor channels simultaneously. Each channel attachment may be equipped with a two-channel switch, permitting attachment to eight individual channels.

Another feature of the 1380 is the inclusion of a flexible disk for program loading (independent of the CPU) and off-line testing. With the communications processor, diagnostics may be performed without interrupting processing.

A typical small 1380 system operating in emulation mode at speeds up to 30 char./sec with asynchronous lines, 32K of memory and a CRT console will cost $1,926/mo on a two-year lease.

A large 1380 configuration operating in NCP/VS mode with line speeds of 2,400 bit/sec to 9,600 bit/sec with SDLC protocol lines, 128K of memory and a CRT console will be $4,780/mo on a two-year lease.

Delivery of the 1380 will begin in the fourth quarter from San Tomas at Central Expressway, 95052.

Adapter Supports Latest Protocols

OCEANPORT, N.J. – Interdata, Inc. has introduced an adapter to interface four synchronous lines between its 16-bit and 32-bit processors and the new data communications protocols.

The quad synchronous adapter (QSA) supports the hardware features of the Synchronous Data Link Control (SDLC), High-Level Data Link Control (HDLC) and Advanced Data Communications Control Procedure (ADCCP) protocols.

One version, priced at $1,600, also communicates with the traditional binary synchronous code (BSC) discipline and can be upgraded easily to a second version, which costs $2,600, and communicates with BSC and the three protocols.

The adapter is a hardware option, contained on a single, 15-in. printed circuit board.

QSA provides the capability of zero bit insertion/deletion and automatic flag insertion/deletion required by the protocols.

Features include modem control capabilities and the ability to modify various character parameters under program control. QSA also provides full-duplex or half-duplex operation and half-duplex interleaving on an individual line basis.

Other features of the QSA are: automatic answering, priority line organization, loop-back line capability, leading sync characters deletion, and automatic parity checking/instruction (BSC).

Interdata is also producing a series of line conditioning modules (LCM) which will convert transistor, transistor logic outputs of the QSA to the various input standards.

First deliveries are scheduled for the fourth quarter from 2 Crescent Place, 07757.

Users Beware

Transition From Batch to On-Line System No Cinch

By Ronald A. Frank
Of the CW Staff

NEW YORK – Users fail to appreciate the magnitude of the transition from a batch to an on-line system. In most cases the user has been deluded into believing no transition exists, and the subject is never mentioned in conversations with vendors, according to Salvatore Catania, a staff member at Coopers and Lybrand Consultants.

"You may have a terminal which can communicate, in a fashion, with a distant CPU; but you don't have a system upon which you can safely bet the future well-being of your company," Catania told an Info 75 session.

The user who arbitrarily assumes the transition to an on-line system is easy "throws away his chance to make that transition smoothly," he warned. Since this user never looks for the problems and the pitfalls, he does not see them until after he has installed his system. He then finds, to his dismay, that the system doesn't meet his needs and that he is in trouble.

Most problems facing the new on-line user fall into three categories: availability, response time and the manual system problem, Catania said.

The availability problem arises when the terminal user goes to his unit during the hours of scheduled service and finds the system cannot be used for a variety of reasons.

The response time creates a problem when the answer to an inquiry takes longer than the terminal user can tolerate and still get his work done.

Confusion, Errors

Manual system problems were described by Catania as the confusion, errors and inefficiencies that are caused by those who interface with the terminal to input the information.

To solve the availability problem, the end user's needs must be designed into the system, and the system must be up for a period equal to or longer than the needs of the user. System availability will not automatically equal the end user's requirement unless this is a design criterion, he said.

Many systems define response time as "immediate" but this can be defined anywhere from one second to 20 seconds depending on the expectations of the user, Catania said.

Many times the user does not realize that the transaction processing software, applications programs, file structure, network design, transaction volume and mainframe speed all combine to yield a resultant response time. This problem can't be hidden from the user since every time he hits his input key he is reminded of it, he said.

Manual system problems occur because many times a person completely unskilled and "most likely ignorant of computers is being called upon to develop a close relationship with a CPU," Catania told the session. When cryptic messages consisting of DP jargon are flashed on their CRT screens, these operators cannot be expected to make logical responses in each instance, he said.

To avoid these problems, Catania advised users to design their systems, instead of just installing them. Among the tools to accomplish a successful design, he listed a performance analysis which should then be superimposed on a least-cost analysis.

The vendor will not guarantee the operation level of an on-line system so long as there are other suppliers' products in the network. And it is virtually impossible to get a teleprocessing capability from a single source. So it falls on the user to take responsibility for the total system performance, Catania said.

Failure Reports Boost Efficiency

NEW YORK – Existing telecommunications networks can often be more efficient with the addition of system failure and line-usage reports, according to Charles Waters, interactive systems specialist at Unicoll Corp. Waters spoke at the recent Info '75 conference here.

A system failure report includes the time the system is down and the time the system is in operation. It also includes a list of the percentage of time lost, the failing component, a description of the problem and the ID of the operator who was interacting with the system when it went down, Waters said.

Line-usage reports list the description of the line whether it is hard-wired or dial-up, the percent availability, the percentage of actual use and the percentage of retries, he said.

When network outages do occur, the user should make use of a recorded message facility available from most local phone companies. This allows a recorded message to be played on all attempts to access the system. When a remote user hears a description of the problem together with an estimate of the expected availability of the line, it will prevent another call to the DP center to get this information, Waters said.

Terminal Tied to T/S Network Negates Need for S/3

HUNT VALLEY, Md. – A local company on the verge of ordering an IBM System/3 decided at the 11th hour to use an in-house communications terminal tied to a remote time-sharing service.

As a result, Remac, Inc., explorer, developer and operator of oil and gas wells and coal mines spends less than $600/mo for both its Memorex communications terminal and its GE time-sharing service, located in Cleveland. These costs are approximately half of the System/3 alternative, the company estimated.

The 1280 cassette communications terminal was designed to function with IBM 360s and 370s. However, Remac reported the terminal has proved reliable when operating as a remote device for entering data to and receiving reports from the GE computer center.

Monthly reports required for numerous partnerships, involved in almost 100 wells and several coal mines, and several quarterly reports prepared for each of the limited partners are routinely cycled. Thus, the terminal currently is used, on average, only 20 hour/mo.

"If the occasion should permit it," pointed out Joseph C. Abraham, Remac's vice-president and treasurer who is responsible for the company's data processing, "we can double the terminal's top speed to 120 char./sec with a minor modification."

The data storage cassette feature allows data entered in the terminal to be temporarily stored on the cassette's magnetic tape.

Operators can verify their keyed inputs with hard-copy exhibits and make necessary corrections before incurring phone line charges and computer connect time.

The company also uses the cassettes to store duplicates of the computer programs off premises. Although the chance of GE losing or obliterating one of Remac's programs is practically nonexistent, Remac could, in such an instance, transmit its programs to Cleveland and restore a current data base.

Phone Connects Remac to System

Remac connects to the remote computer by dialing a phone number and placing the phone in a coupler attached to the terminal.

Since the percentage participation by individuals in limited partnerships varies, programs covering analyses of their investments, specifically taxable income, cash flow and investment analysis are run separately. The income analysis delineates sources of income and expenditures to arrive at taxable income (or loss) at various stages of well or mine activity.

Incorporated in the analysis are calculations indigenous to drilling and mining activities depletion. Similar in theory to depreciation, depletion is an accounting loss allowed by law to offset income, an investor tax break to encourage exploration of nonregenerative assets such as oil, gas, coal and minerals.

The firm's continuous reporting to its limited partner/investors not only lets them know of the status of various ventures but allows them a degree of tax planning options well before the end of the taxable year.

According to Abraham, the terminal has proved reliable since its installation late last year.

Spare Back-Up Switch Eases Modem Change

PROVIDENCE, R.I. – International Data Sciences, Inc. (IDS) has introduced the Model 8509 spare modem back-up switch. Utilizing this module, a single spare modem may be switched in to replace any one of a group of on-line modems by operating a front panel switch.

The 8509 is compatible with earlier modules in the IDS Series 8500 EIA switch patch and monitor systems.

Up to four modules may be mounted in a Model 8503-8 module cage and subsequently mounted in a 19 in. relay rack.

Price of the 8509 is $220, and delivery is from stock. The firm is at 100 Nashua St., 02904.

NSC Series 500 Transceiver Operates at 50M Bit/Sec

ST. PAUL, Minn. – Network Systems Corp. (NSC) Series 500 transceiver provides high-speed data communication via coaxial cable at data rates from 1.5M bit/sec to 50M bit/sec.

Six models are presently available, facilitating high-speed digital transmission at a data rate of 50M bit/sec up to 500 feet.

Multiple transceivers can be attached to a single coaxial data trunk. A serial data interface allows attachment of a range of any make equipment, from mainframes to storage devices. Purchase price of the Series 500 is $5,000 with 90-day delivery from 315 North Pierce St., 55104.

HP CRT Features Built-in Mass Storage

PALO ALTO, Calif. – Hewlett-Packard has a CRT terminal with 320,000 bytes of built-in mass data storage. The Model 2644A reportedly can perform on a stand-alone basis many operations normally requiring connection to a computer.

Two fully-integrated tape transports, using a miniature version of the 3M Co. data cartridge, are said to provide enough data storage for a day's information. For data entry, forms can be stored on one minicartridge and selectively retrieved in seconds. Program preparation, editing, tape copying, and tape-to-printer operations are within the stand-alone abilities of the microprocessor-controlled 2644A. The unit is called a mini data station.

Protected fields, video highlighting and editing capabilities are included.

The entered data may be stored on a second minicartridge by pushing a button. Later, full minicartridges of data can be batch-transmitted to a mainframe. The 2644A includes a range of microprogrammed instructions.

With these stand-alone abilities, the 2644A reduces on-line time costs, cuts

Terminal Transactions

line charges in remote operations and lessens demands on computer resources, the firm said.

Single-Button Functions

Single keys execute the most common tape data transfer commands. Touching any FILE button automatically calls up the appropriate one of the first eight files on a cartridge. Typically these are forms. READ and RECORD are single-button functions.

Two prefix keys are said to speed operations. Input/output functions are assigned by first touching the green prefix key, then the appropriate input and output device keys. Data path architecture of the 2644A is generalized so data may be moved among any of the station's functional units, between cartridge tapes, from the keyboard, to or from the display's semiconductor memory, to a printer, to or from the RS-232C data communications interface.

A gold key is the prefix for quick access to extended operations. For example, "Gold Key + find file key + file number + cartridge ident key" calls up any of 255 files at search speed (60 in./sec). File records may vary in length from 1 byte to 256 bytes, stored in Ascii or binary format.

In the 2644A, 115,000 bytes of serial

HP 2644A Mini Data Station

information are recorded single-track on each cartridge, using the full .15-in. width of the minicartridge's 140 feet of tape at a density of 800 bit/in. Tape speed is 10 in./sec so transfer rate to or from the display is up to 8 kbit/sec since search is at 60 in./sec, average access time is 10 seconds. One cartridge contains the equivalent of 1,000 feet of paper tape.

Same Display as 2640A

The 2644A has the same 5 in. by 10 in. display as the earlier HP 2640A. Within the display, 1,920 characters can be presented in a 24-line by 80-column format. A 9 by 15 dot character cell displays characters. Inverse video (black on white), blinking, half-bright and underlining may be employed in all of a possible 16 combinations. The 2644A can display multiple character sets. A 128-character Roman set, including lower case and displayable control characters, can be used, along with as many as three additional character sets.

A math symbol set is available, and a line drawing set which can be used to generate the user's entry data forms on the 2644A display.

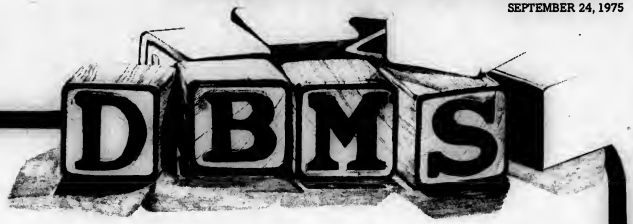
Editing capability is provided to correct data before transmission or recording. Standard features include character and line insert and delete; cursor sensing and positioning; programmable, protected fields for forms; off-screen, solid-state memory storage with scrolling and page-select; tabulation, eight special-function keys for user-defined routines; and a positional memory lock.

The 2644A uses an Ascii RS-232C communications interface and can transfer data from semiconductor memory at rates up to 2,400 bit/sec, (9,600 bit/sec on binary output).

The mini data station is priced at $4,400. Deliveries start in October from 1501 Page Mill Road, 94304.

A Computerworld Special Report

SEPTEMBER 24, 1975



What is a data base management system?

In simple terms, a DBMS is a cushion between programmer and data, freeing him to concentrate on application logic. The DBMS handles the mechanics of storing, updating and accessing the data, wherever it is in the system, much as operating system software handles the mechanics of managing the computer system resources, creating a cushion between programmer and machine.

A pretty picture perhaps, but what does it mean in fact? What *is* a DBMS?

There are four basic elements: the data base; queries and query programs; physical and logical file organizations; and the data management functions.

The first three elements are essentially conceptual. The fourth serves to realize the designer's intentions, according to Leo J. Cohen, president of Performance Development Corp. (PDC).

Writing in *Data Base Management Systems: A Critical and Comparative Analysis*, Cohen explained that the set of data management functions supplies the utility programs to be executed by the DBMS, to supply the desired data base services to the user.

But many of the packages being marketed as DBMS are very generalized systems, Cohen warned. They are not designed for a specific problem nor are they implemented for a specific machine configuration.

The user must have the skills to tailor the general capabilities to function in a specific setting.

Even though the physical file structure is transparent to the application programmer, the author added, the system designer must realize that the structure will optimize either retrieval or space management, and that one objective is achieved at the expense of the other.

Readers responding to *Computerworld*'s appeal for data on data base [CW, Aug. 27] urged the inclusion of detailed comparisons of currently available DBMS in this report. Frankly, that seems out of the question. Vendors have announced all sorts of new capabilities recently, for one thing. Cohen's book, covering just four of the systems in detail, ran over 200 pages, for another.

But QED Information Sciences, which shared the publishing of Cohen's opus in 1973 with PDC, has recently published another, *DBMS, A Practical Reference* by Ian Palmer, to add to the picture. And Auerbach and Datapro cover the systems regularly.

Several packages are generally regarded as the major DBMS offerings: IBM's IMS (and its subset, DL/1); Cincom Systems' Total; Cullinane's IDMS; MRI Systems Corp.'s System 2000; and Software AG's Adabas.

Though all work on IBM equipment, Total and System 2000 – at least – can also be used in other environments.

And Burroughs, Digital Equipment Corp., Univac and the now-departing Xerox, along with a number of minicomputer manufacturers, all offer data base systems.

Beyond that, there are a number of other packages from independents and they seem to be DBMS or very close to it. The Computer Information Management Co.'s Datacom is in this group and is being marketed along with the Computer Software Co.'s Edos, though it works well on its own under IBM's DOS.

Infodata's Inquire has developed over the years from an inquiry and retrieval system to a full-blown DBMS with the addition last year of a multiple file-handling capability.

Computer Corp. of America has had Model 204 for several years, but has kept a very low profile.

The Software House's System 1022 showed up first on several of the remote-computing networks. Most of the nets now offer a choice of data base systems to meet their clients' varying needs.

The prospective user is faced with evaluation of the available packages, decisions on the first project to be put under DBMS, plans for staff training, the need to learn the techniques of collecting appropriate data, a determination of the proper physical and logical file structures to meet specific project needs and the bookkeeping to keep the data base useful and not overly redundant.

Somewhere in the process – perhaps at several points, for the timing varies from shop to shop – management has to make go/no go decisions. Even if DBMS seemed a great idea at first, these systems may impose too much overhead on some installations, especially those with multiple but clearly unrelated batch-oriented applications that are almost completely sequential in nature and are well-suited for magnetic tape files.

This special report is a mix of tutorial material and user experience. The points made by the various authors may help current and prospective DBMS users put their goals and their systems in better perspective. If so, we're glad.

Checking Out U.S. Experience

Move to DBMS Often Forced by Unavoidable Pressure

By Don Leavitt
Of the CW Staff

The decision to implement a data base management system (DBMS) seems almost forced upon an organization by definite pressures, according to the author of a slim paperback recently published by England's National Computing Centre (NCC).

Very few of the 21 U.S. user sites visited by a study team from NCC admitted having any doubts about the basic decision, senior consultant Brian Savis said in *Data Base Management Systems: User Experince in the U.S.*

Managers at several of the sites told him it should be obvious whether an organization would benefit from a data base approach. There is a need sensed to find a better tool to solve a set of general problems, and a few of the sites saw integration of data as a significant first goal, he said.

Installations currently considering the use of DBMS will no doubt be disturbed that cost benefits are generally not quantifiable, "although this is hardly surprising at the present state of the art," Davis added.

Davis' little book resulted from inquiries NCC got in 1973 from its members trying to gain insight into the cost justifications of installing DBMS. A rather quick survey of the user base in the UK convinced the center interviews in the U.S. might be beneficial, since there was more DBMS experience in North America.

A team of four investigators – two (including Davis) from the center and two from British Industry – spent three weeks in May of 1974 holding fairly structured interviews with 21 U.S. user organizations.

The installations were to be a reasonable cross-section of typical users, Davis noted, so the team "deliberately avoided many of the large prestige sites."

Packages found in the sites they did visit were "fairly representative of those available," although Davis said he wished the team had found more of Software AG's Adabas and Univac's DMS-1100 users.

Concerned with practical experience rather than technical details and logic of the DBMS packages themselves, the book moves from reasons a data base approach was adopted, the method of approach and the selection of DBMS software through development and implementation into considerations of data base administration.

Users tend to recognize selection of data management systems requires a more rigorous approach than past projects. This was shown by their real interest in the experience of other users, particularly those with similar environments, and by the involvement of both users and management, Davis noted.

In the more successful shops, implementation of a system, once selection was completed, tended to be a very gentle process – "start simple and evolve," the users told Davis.

Detailed long-range planning is not generally very effective even in conventional DP because of the way requirements change during the implementation process. In a data base environment, it is even less effective, Davis said, citing two reasons for this, perhaps surprising conclusion:

- Once the timeliness and availability of data is improved, the information processing requirements of the organization tend to change to take advantage of

(Continued on Page S/5)

Indeed, DBMS Has Come a Long Way, Baby

By Don Leavitt
Of the CW Staff

The data base and the various data base management systems (DBMS) are a natural and inevitable outcome of the progressive development of DP techniques, according to Ian Palmer of Caci, Inc. International. Author of *Data Base Systems: A Practical Reference*, Palmer said the development to data base can be traced through a number of stages.

It started in the mid-1950s with simple applications using serial files that were often nothing but conversions of existing punched card systems. In those earliest of days, there was little analysis distinct from programming; the programmers dealt with each system individually, since there was no general-purpose software.

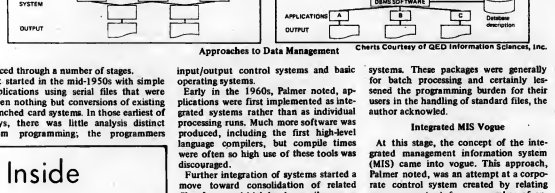
Once the need for systems analysis was appreciated, it also became evident to some that – because the data was not in computer-readable form – additional systems using the data were now feasible where they had been impractical in a manual environment. And control software began to appear in the form of input/output control systems and basic operating systems.

Early in the 1960s, Palmer noted, applications were first implemented as integrated systems rather than as individual processing runs. Much more software was produced, including the first high-level language compilers, but compile times were often so high use of these tools was discouraged.

Further integration of systems started a move toward consolidation of related files. Improved high-level compilers came into use with capabilities such as the Cobol COPY statement that allowed file descriptions to be stored and brought into any program needing the same data. Support for indexed sequential and random files showed up in this time frame.

In the mid-1960s, managers began to see the potential of computers as aids to decision making in addition to being able to handle bulk data processing. This development led to the concept of management information systems, which required more comprehensive data files. The file structures then available were largely organized to meet the needs of specific applications and that led, in turn, to duplicated and often inconsistent data, Palmer noted.

To ease the handling of these files, specialized software was developed and marketed – including a whole range of "second-generation" file management, data analysis, interrogation and reporting systems. These packages were generally for batch processing and certainly lessened the programming burden for their users in the handling of standard files, the author acknowled.



Approaches to Data Management

Charts Courtesy of QED Information Sciences, Inc.

Integrated MIS Vogue

At this stage, the concept of the integrated management information system (MIS) came into vogue. This approach, Palmer noted, was an attempt at a corporate control system created by relating summary output from a number of applications, each of which was based on its own input data.

The result was a large, cumbersome and fragile system involving many data files, sorts and merges and data moved to the top. The interdependence of such an "integrated" system was often such that if any one file or program failed, the complete system was brought to a halt.

Despite the problems with MIS, integration of files continued and the need for more useful, and inevitably more com-

(Continued on Page S/4)

On the Inside

In-House Trainees Seen Best for DBMS Understanding S/4
Administrator Must Have Both Skills and Authority S/7
Small Staff Handles Switch to 'Total' Environment S/8
File Organization Should Be Matched to Situation S/9
Concept of Data Resource Management Vital to DBMS S/12
Projects Should Gain From Business-Based Analyses S/13

This special report was prepared under the direction of Don Leavitt, CW's associate editor/software.

Extra Time and Care Needed for Effective Evaluation

By T. Jack McElreath
Special to Computerworld

The first step in the selection of a data base management system (DBMS) is the identification of required criteria. Required criteria are those capabilities which must be met by that DBMS to fit into your installation.

These criteria fall into several different areas. The first area is hardware compatibility. Most installations are probably not going to consider changing manufacturers or upgrading the mainframe of their computer. As a result, the DBMS they select will have to run on their current equipment.

The same is true for peripheral devices, for example, disks as opposed to data cells. It would be expected the DBMS would be supported by those devices. If a heavy investment has already been made in a particular type of communication device, we would expect that DBMS would support that communication device.

The next area is systems software compatibility. For example, you may be running DOS and may not want to consider going to OS. Therefore, your DBMS would have to run under DOS.

If you are considering teleprocessing, you would expect the DBMS to support the teleprocessing system in which you have already made a large investment. You would definitely not consider a DBMS which does not support teleprocessing at all.

Finally, there are interfacing abilities that must be considered. If you are a Cobol shop, you would expect to be able to interface with that DBMS via Cobol.

Subjective Evaluation

Once you have identified the required criteria, identify factors upon which a subjective evaluation of the DBMS will be made. Generally, there are five areas of subjective evaluation: vendor support, data security, vendor qualifications, operational environment and technical capabilities.

In terms of vendor support, the first concern is the formal education provided by the vendor. Not only the cost and content, but the availability of the education is important.

Second is documentation. Is the package well documented? Is it provided at a general level as well as a detail level?

Next, what type of maintenance support can you expect from the vendor? What is the level of the expertise of his staff? Is the response time within 24 hours or within a week? Will the vendor provide you with on-site implementation assistance?

This is probably one of the more important areas – unless your staff includes a software expert, it will be very difficult for you to install the DBMS without vendor assistance.

In areas of data security, you might consider the following. What type of restricted access is offered by the package? Are you restricted at data element level or at the data base level? For example, in IMS the only restriction is at the segment level which is groupings of data. Does it offer good checkpoint recovery procedures? Does it offer a logging feature? Generally, a logging feature records all updates against the data base for use when recovering.

Finally, how good are the software diagnostics? If the data base management system goes down with a software failure, does it tell you where it occurred? Or, in the case of a hardware error, are you made aware that it was hardware?

Evaluate Vendors

With the proliferation of DBMS today, we find many are supported by small software firms whose financial strength is weak at best.

To assure continuing support, the user should evaluate the financial position of the vendor. He should also evaluate the type of experience, both in applications and environment, the vendor has had with his DBMS. If he has had experience in applications and environments similar to your own, it may mean the installation of your system will be that much easier.

Also, does he have plans to revise and enhance the system to keep pace with software technology? An affirmative response will generally give you an indication of the vendors commitment to keeping his software current with other technology.

Considerations here are fairly straightforward. Hardware requirements revolve around the amount of core and types of peripherals you are willing to support, thereby limiting the DBMS to those that fall within your restrictions. You may have data communications equipment already in-house that you would expect the DBMS to support. The same is true of operating systems.

Technical Capabilities

The final consideration in the area of subjective evaluation is the technical capabilities of the DMBS. A major consideration in this area is whether the DBMS supports a data dictionary. Although the data dictionary feature can be regarded as one of the key features of the DBMS, there are few DBMS that support the feature.

Essentially, a data dictionary allows you to reference each data element that is contained within a DBMS, determine what programs access that element, how it is accessed and whether it is updated or merely inquired upon. While a data dictionary is not a necessary feature of a DBMS, the facility it supports will provide an installation with ease of data maintenance and reference. Considerations should be given to the ease of changing the data base once it is structured and built and the ease of adding to it as the data grows.

Another important feature of a DBMS is its ability to provide you with performance measurement statistics. As data is added to a data base, the accessing performance deteriorates. As a result, processing times and costs increase substantially. Without reliable performance measurement statistics, it is difficult to mea-

(Continued on Page S/6)

Bad Experience With One DBMS Makes User Cautious in Tests

By Don Leavitt
Of the CW Staff

SAN DIEGO – Know your own situation.

Plan – to see if a data base management system (DBMS) would help.

Examine at least a couple of candidates and then test the first choice thoroughly before putting it in a production environment.

Work with the DBMS vendor and encourage the company to work with you.

Almost platitudes, but those rules really work, according to Gregg Locher, assistant data base administrator at Home Federal Savings & Loan Association, where Cullinane's Integrated Data Management System (IDMS) has been under test for the past several months.

So far only the batch-oriented capabilities have been tested, Locher said recently, and it will probably be next year before the communications support has been interfaced and completely tested.

"We're really trying to wring it out and beat it into the dirt as much as possible," he added in a colorful if mixed metaphor.

Home Federal's careful approach seems thoroughly justified. The savings and loan (S&L) Institution has "just about everything" riding on successful implementation of a DBMS in a teleprocessing environment.

The association has somewhere close to 200 IBM 2980 S&L-oriented teletypewriter terminals in 38 branches stretching from San Diego to Sacramento, all feeding into a 360/65 at headquarters here.

Beyond that, Locher admitted, it's known what can happen if capabilities and responsibilities aren't worked out carefully ahead of time. The IDMS test is the second time Home Federal has tried to come up with a DBMS.

"I can't really say much about it now because it's in litigation," he said, adding the bad experience helped Home Federal discover "just how deeply we have to test it, to wring it out (that phrase again) so we can find out if it's not going to perform before we make a firm commitment."

Sharply Narrowed Field

Against that background, data base administrator Martin Vehanen and Locher sent requests for proposals to three vendors last February. The S&L was able to narrow the field that sharply because it is an installation using the Computer Software Co.'s Extended DOS (Edos) and there aren't many DBMS for the DOS-type environment.

The requests included what Locher called "paper benchmarks" which defined Home Federal's then-current equipment, what the association expected to change and what it was getting in response time with its teleprocessing monitor.

The 360/65 has 512K bytes of main memory and the S&L intends to stay with it for a period of years. "We'll work it 'til it dies, I guess, but may add a little bit more core – a 'bolt-on' unit – or a second CPU for backup purposes," Locher said.

Supporting the 65 are 21 Model 2314 disks but, at the end of this year or early in 1976, the S&L will be going into a conversion to 3330s. The teleprocessing monitor now in use is a home-grown affair, "sort of a modified indexed sequential method, and everything is just super fast, with double buffering, chaining and all."

Terminal operators wait no more than two or three seconds for the first line of response, no matter how heavy the load, "and not much degradation at all is acceptable the way things are going now," Locher added.

Home Federal weighed the proposals it received and signed contracts with Cullinane in April to get IDMS in on a test environment.

The batch-oriented tests have been heavier than conventional DOS shops could throw at a DBMS; with Edos, Home Federal has six-partition support and has been running IDMS in one and the Edos scheduler in another, leaving four application partitions to exercise the DBMS.

The association is apparently one of the first users of IDMS' "central" facility, which allows one copy of the DBMS to service multiple partitions. Users in the four application partitions have had full access to the data base, including both updating and retrievals, and that kind of

(Continued on Page S/8)

Vendor Offers Courses, But...

In-House Trainers Seen Best for DBMS Understanding

By Don Leavitt
Of the CW Staff

SAN FRANCISCO – Almost all vendors of data base management systems (DBMS) offer customers training in the ins and outs of their systems. And many of the courses are good.

Software AG certainly provides training for its Adabas customers, but Robin Gillette, data base administrator (DBA) at Pacific Mutual Insurance Co., feels strongly a using company should not – must not – depend on the vendor for continuing training throughout the organization.

Education of a broad number of people "should not be uninteresting to the data base administrator," he said. "If data is to be a corporate resource – and that is a basic premise of DBMS – you must have more than the small DBA staff involved."

After an initial cycle in which Software AG trains the first line of user personnel, the user staff should run the classes themselves, even though the vendor could continue to do it, Gillette said, adding he saw three basic reasons for this approach.

In the first place, every user environment is unique, he said. Even if two companies are in the same business and have the same DP equipment and the same DBMS, the people and the organizations are bound to be different. And education has to be geared to the people being trained.

More than that, if the user is running his own classes, the format can be changed – often on the spur of the moment – to meet unique situations. The vendor's original subject outline and scheduled times can be extended or compressed if required, Gillette noted.

Finally, he said, the DBA in a company just moving to DBMS may have a credibility problem, and the teaching of a course about the incoming system – it's done well – is a good way for the DBA to establish a reputation as an expert on the subject.

To illustrate his points, Gillette noted that, at Pacific Mutual, the Adabas course has been designed to last five days, instead of the three Software AG usually schedules. But Gillette uses only the mornings for lectures, leaving the afternoons free so students can keep track of their regular work and do their data base homework in a normal work environment.

Some of the homework is reading and studying of Adabas manuals, but the heart of it is a workshop problem that is not even finished within the week of the class. Instead, the data base on which the problem is based is left up and accessible on the company's computer for two or three weeks longer so the students can finish the assignment.

There is considerable interest in completing the assignment, he added with a chuckle, since the final, correct output of the problem is a certificate stating that the particular student has successfully

(Continued on Page S/6)

Needs, Facilities Evolved From Files

(Continued from Page S/2)

plex, structures for the linking of data was recognized.

The classic application with this requirement was bill-of-material processing, according to Palmer, and many manufacturers developed generalized software support such as IBM's Bomp package.

The solution to the problems of integrated MIS was seen to be the integration of files rather than of applications. Increasingly, identical or related data was used for more than one application and the result was often conflict between the data storage needs of operational systems and the newer control systems.

The answer to that kind of conflict was believed to lie in the further investigation of data using list-processing techniques, and Palmer noted that, in fact, General Electric released software of this type as early as 1965.

The term "data base" first came into common usage in the late 1960s, he went on. Large firms were finding that, despite enormous and continuing – and that was probably the real complaint – investment in their DP facilities, adequate information was still not available for the control and planning of their businesses.

The volume of data handled was high; the many systems involved lacked coordination; and the costs for systems and programming maintenance were increasing rapidly. Several large firms decided that, because the available MIS and data storage software was inadequate, the solution was to develop their own data base systems.

By the early 1970s, Palmer said, the corporate data base was widely recognized as the desirable approach to DP. With the emphasis on multiple on-line access to make the best use of the data base, the software becoming available was much more advanced.

All major computer manufacturers were committed to supplying generalized data base systems and the terms "data base management systems," "DBMS" and "third-generation data management software" came into use. For the first time, the data base approach became a practical alternative for the majority of computer users, Palmer claimed.

This trend continues, he added, but to be acceptable a modern DBMS must provide more than integration of data, complex file structures and on-line access. The latest software has to have the additional facilities of data base reorganization, data privacy, full recovery procedures and independence of the application programs from the data base.

The current approach to data base technology is the result of progressive development where each step was aimed at meeting problems – often unforseen – that arose with the then-latest data processing techniques. From an overall computing viewpoint.

Palmer's book was published earlier this year by QED Information Sciences, Inc., Wellesley, Mass.

Administrator Must Have Both Skills and Authority

A data base environment may be broken into three major functional areas: the data base management system (DBMS) software; the users of the data base; and the data base administrator (DBA).

The DBMS comes between the application programmer and the data, much as an operating system comes between the programmer and the computer itself. In any case, the DBMS carries out requests upon the data base specified by the user – more specifically, by the programmer.

The DBA defines the rules which govern control and access of the data and the method of physical storage of the data. He handles this function via a descriptive data base language, with which he can:

- Define and describe the data.
- Define the logical relationship and interrelationship of the various segments of data.
- Define the physical storage of the data and its attributes.
- Define and describe the logical view of the data as it may be seen by the application programmer and the interrelationships of the logical views to the physical data structure.
- Define the security measures applicable to each user and to the data base.

The DBA assigns to each element a unique mnemonic name which will give an indication of the data element's logical meaning. The definition of the logical relationships that exist for the various data types and elements to logical and physical data structures is an additional task of the DBA.

Such a relationship definition is vital if the application program is to be able to manipulate the data it requires. The DBA should also describe through a data de-

(Continued on Page S/15)

Some Benefits Fuzzy, U.S. Users Say

(Continued from Page S/2)

the new situation – in a way that is often difficult to predict.

● The process of implementation leads to a better understanding of the way information flows in the company. This tends to turn planning into an iterative process and "the complexities of the situation mitigated against any other approach," Davis said.

The selection of the DBMS software – only part of the planning process involved in implementing a data base environment – has recently become a much more formal process. Greater attention is now being paid to comparisons of features, performance and resource requirements of competing packages.

As the user base grows, there is more evidence on which to base a decision, the sites told Davis. With the exception of cases where available hardware allows no choice, he found, "there is a definite resistance toward installing the manufacturer's package without having first thoroughly explored all the alternatives."

Little Concern for Standards

At the time of his survey, at least, Davis saw little concern for DBMS standards. "The people we saw were in general more concerned with solving today's problems than in worrying about tomorrow's standards," he noted.

Vendor support or expertise developed in-house would get users around any problems that crop up in future.

Though implementation of data base-oriented applications was seen as requiring a more careful approach than conventional applications, most organizations attempted the actual implementation using their normal procedures, Davis said.

This is probably because the initial objectives were to keep things as simple as possible by minimizing the degree of integration and allowing systems to evolve in the light of experience, he added.

In a few cases, when the scope of the proposed system was more ambitious, the needs for tighter controls and more detailed planning were recognized in the beginning. Typically, however, these needs were sensed and addressed only as implementation progressed.

The simple approach seemed to account for the growing awareness of the need for a data dictionary and performance-monitoring facilities, Davis said. An awareness of the need for reliability and security was made much more apparent by the use of on-line facilities, he added in a typically British understatement.

Type Affects Development

The type of DBMS package used appeared to Davis and his teammates to have a "significant effect" on the development process.

IBM's IMS and packages following the Codasyl data base task group specifications "seemed to require more detailed planning, involve a longer implementation period and a higher level of skill in design staff than did [Cincom's] Total, Adabas and [MRI's] System 2000," the author noted.

Regardless of the package used, Davis noted, virtually all the organizations interviewed had a number of data bases; the majority had two or three, and the maximum number encountered was 11.

The direct access storage requirements of the data bases ranged from 16M bytes to 2.8G bytes, the majority being less than 500M bytes, the study found.

About half the orgnizations had established a data base administrator and another 25% told the NCC team they felt they would need one in the near future. In general, the functions of the position evolved as the implementation of the DBMS proceeded to involve more and more applications.

The need for the position and the specifications of its functions became more apparent as the process gained momentum, Davis noted.

Although several users saw the need to provide the administrator with executive authority, there were some organizational problems in achieving it. Finding the right person for the job would also seem to present problems, he added.

Davis' book was published by NCC Publications, David & Charles (Holdings) Ltd., South Devon House, Railway Station, Newton Abbot Devon, England. In the UK, it sells for 2.80 pounds.

Vendor Offers Courses, But...

In-House Trainers Seen Best for DBMS Understanding

By Don Leavitt
Of the CW Staff

SAN FRANCISCO – Almost all vendors of data base management systems (DBMS) offer customers training in the ins and outs of their systems. And many of the courses are good.

Software AG certainly provides training for its Adabas customers, but Robin Gillette, data base administrator (DBA) at Pacific Mutual Insurance Co., feels strongly a using company should not – must not – depend on the vendor for continuing training throughout the organization.

Education of a broad number of people "should not be uninteresting to the data base administrator," he said. "If data is to be a corporate resource – and that is a basic premise of DBMS – you must have more than the small DBA staff involved."

After an initial cycle in which Software AG trains the first line of user personnel, the user staff should run the classes themselves, even though the vendor could continue to do it, Gillette said, adding he saw many basic reasons for this approach.

In the first place, every user environment is unique, he said. Even if two companies are in the same business and have the same DP equipment and the same DBMS, the people and the organizations are bound to be different. And education has to be geared to the people being trained.

More than that, if the user is running his own classes, the format can be changed – often on the spur of the moment – to meet unique situations. The vendor's original subject outline and scheduled times can be extended or compressed if required, Gillette noted.

Finally, he said, the DBA in a company just moving to DBMS may have a credibility problem, and the teaching of a course about the incoming system – if it's done well – is a good way for the DBA to establish a reputation as an expert on the subject.

To illustrate his points, Gillette noted that, at Pacific Mutual, the Adabas course has been designed to last five days, instead of the three Software AG usually schedules. But Gillette uses only the mornings for lectures, leaving the afternoons free so students can keep track of their regular work and do their data base homework in a normal work environment.

Some of the homework is reading and studying of Adabas manuals, but the heart of it is a workshop problem that is not even finished within the week of the class. Instead, the data base on which the problem is based is left up and accessible on the company's computer for two or three weeks longer so the students can finish the assignment.

There is considerable interest in completing the assignment, he added with a chuckle, since the final, correct output of the problem is a certificate stating that the particular student has successfully

(Continued on Page S/6)

Needs, Facilities Evolved From Files

(Continued from Page S/2)

plex, structures for the linking of data was recognized.

The classic application with this requirement was bill-of-material processing, according to Palmer, and many manufacturers developed generalized software support such as IBM's Bomp package.

The solution to the problems of integrated MIS was seen to be the integration of files rather than of applications. Increasingly, identical or related data was used for more than one application and the result was often conflict between the data storage needs of operational systems and the newer control systems.

The answer to that kind of conflict was believed to lie in the further investigation of data using list-processing techniques, and Palmer noted that, in fact, General Electric released software of this type as early as 1965.

The term "data base" first came into common usage in the late 1960s, he went on. Large firms were finding that, despite enormous and continuing – and that was probably the real complaint – investment in their DP facilities, adequate information was still not available for the control and planning of their businesses.

The volume of data handled was high; the many systems involved lacked coordination; and the costs for systems and programming maintenance were increasing rapidly. Several large firms decided that, because the available MIS and data storage software was inadequate, the solution was to develop their own data base systems.

By the early 1970s, Palmer said, the corporate data base was widely recognized as the desirable approach to DP. With the emphasis on multiple on-line access to make the best use of the data base, the software becoming available was much more advanced.

All major computer manufacturers were committed to supplying generalized data base systems and the terms "data base management systems," "DBMS" and "third-generation data management software" came into use. For the first time, the data base approach became a practical alternative for the majority of computer users, Palmer claimed.

This trend continues, he added, but to be acceptable a modern DBMS must provide more than integration of data, complex file structures and on-line access. The latest software has to have the additional facilities for data base reorganization, data privacy, full recovery procedures and independence of the application programs from the data base.

The current approach to data base technology is the result of progressive development where each step was aimed at meeting problems – often unforeseen – that arose with the then-latest data processing techniques. From an overall computing viewpoint.

Palmer's book was published earlier this year by QED Information Sciences, Inc., Wellesley, Mass.

Administrator Must Have Both Skills and Authority

A data base environment may be broken into three major functional areas: the data base management system (DBMS) software; the users of the data base; and the data base administrator (DBA).

The DBMS comes between the application programmer and the data, much as an operating system comes between the programmer and the computer itself. In any case, the DBMS carries out requests upon the data base specified by the user – more specifically, by the programmer.

The DBA defines the rules which govern control and access of the data and the method of physical storage of the data. He handles this function via a descriptive data base language, with which he can:

- Define and describe the data.
- Define the logical relationship and interrelationship of the various segments of data.
- Define the physical storage of the data and its attributes.
- Define and describe the logical view of the data as it may be seen by the application programmer and the interrelationship of the logical views to the physical data structure.
- Define the security measures applicable to each user and to the data base.

The DBA assigns to each element a unique mnemonic name which will give an indication of the data element's logical meaning. The definition of the logical relationships that exist for the various data types and elements to logical and physical data structures is an additional task of the DBA.

Such a relationship definition is vital if the application program is to be able to manipulate the data it requires. The DBA should also describe through a data de-

(Continued on Page S/15)

Some Benefits Fuzzy, U.S. Users Say

(Continued from Page S/2)

the new situation – in a way that is often difficult to predict.

- The process of implementation leads to a better understanding of the way information flows in the company. This tends to turn planning into an iterative process and "the complexities of the situation mitigated against any other approach," Davis said.

The selection of the DBMS software – only part of the planning process involved in implementing a data base environment – has recently become a much more formal process. Greater attention is now being paid to comparisons of features, performance and resource requirements of competing packages.

As the user base grows, there is more evidence on which to base a decision, the sites told Davis. With the exception of cases where available hardware allows no choice, he found, "there is a definite resistance toward installing the manufacturer's package without having first thoroughly explored all the alternatives."

Little Concern for Standards

At the time of his survey, at least, Davis saw little concern for DBMS standards. "The people we saw were in general more concerned with solving today's problems than in worrying about tomorrow's standards," he noted.

Vendor support or expertise developed in-house would get users around any problems that crop up in future.

Though implementation of data base-oriented applications was seen as requiring a more careful approach than conventional applications, most organizations attempted the actual implementation using their normal procedures, Davis said.

This is probably because the initial objectives were to keep things as simple as possible by minimizing the degree of integration and allowing systems to evolve in the light of experience, he added.

In a few cases, when the scope of the proposed system was more ambitious, the needs for tighter controls and more detailed planning were recognized in the beginning. Typically, however, these needs were sensed and addressed only as implementation progressed.

The simple approach seemed to account for the growing awareness of the need for a data dictionary and performance-monitoring facilities, Davis said. An awareness of the need for reliability and security was made much more apparent by the use of on-line facilities, he added in a typically British understatement.

Type Affects Development

The type of DBMS package used appeared to Davis and his teammates to have a "significant effect" on the development process.

IBM's IMS and packages following the Codasyl data base task group specifications "seemed to require more detailed planning, involve a longer implementation period and a higher level of skill in design staff than did [Cincom's] Total, Adabas and [MRI's] System 2000," the author noted.

Regardless of the package used, Davis noted, virtually all the organizations interviewed had a number of data bases; the majority had two or three, and the maximum number encountered was 11.

The direct access storage requirements of the data bases ranged from 16M bytes to 2.8G bytes, the majority being less than 500M bytes, the study found.

About half the orgnizations had established a data base administrator and another 25% told the NCC team they felt they would need one in the near future. In general, the functions of the position evolved as the implementation of the DBMS proceeded to involve more and more applications.

The need for the position and the specifications of its functions became more apparent as the process gained momentum, Davis noted.

Although several users saw the need to provide the administrator with executive authority, there were some organizational problems in achieving it. Finding the right person for the job would also seem to present problems, he added.

Davis' book was published by NCC Publications, David & Charles (Holdings) Ltd., South Devon House, Railway Station, Newton Abbot Devon, England. In the UK, it sells for 2.80 pounds.

User-Run Training More Easily Shaped to User Needs

(Continued from Page S/4)

completed the assignment and the course.

That sounds simple, he said, but there are a couple of "hookers" in the project and the student coding has to be done in exactly the right sequence or the lines of the certificate will be generated in crazy quilt fashion.

General Introduction

To bring the students to the point where they know how to code the problem, Gillette starts with a general introduction to conventional DP and to DBMS concepts. He utilizes many of the marketing-oriented slides provided by Software AG, but then adds his own material.

Although the Software AG slides or others of similar quality are very nice, he noted, there are cheaper techniques for putting desirable material into audio-visual form. In particular, overhead projector "foils" can be very effective, since one original drawing or chart can be used to create both the transparency and paper copies of the material for student handouts.

To highlight specific points on the slides, color can be added – often using nothing more elaborate than one of the felt-tipped markers that are so common in most offices, Gillette added.

The amount of detail might vary depending on the students' prior knowledge, but the first day would cover the differences between file-oriented DP, in which the required associative techniques tend to be static, and data base operations, where growth naturally occurs in both the type and volume of data and the user community accessing it.

Throughout the course, Gillette said, students are asked a series of multiple-choice questions, with the hope they will get them right. But there is no penalty for wrong answers; the questions are asked so the instructor knows for sure how the individual student is thinking.

The second day of classes at Pacific Mutual gets the students into the basic capabilities of Adabas and the responsibilities of the users. They begin to learn how to define data, how to load it into fields or records under the data base and the basics of updating and retrieval of information once it has been stored.

The instructor proposes two files, one on people, including individual student profiles, and the other on tasks to be completed during class. With utter realism, these include clear definitions of such things as the coffee breaks scheduled each day, the final exam and the problem task.

A handout describes the student file and the students are shown how to reach in and make changes where needed. The student profiles contained some errors and this day's assignment is for each student to put his own records back the way they should be.

Here again, there is another lesson to be learned. The entire student file is insecure, Gillette said, and students can and do tinker with each other's records. The value of data security is made clear even before the subject comes up in class.

Command Usage

The third day of classroom instruction covers command usage under Adabas and at this point the students are given the start of the program with which they can generate their certificates. This skeleton has the certificate print logic, Gillette noted, but not the code needed to extract the personal data from the student's records.

Day four at Pacific Mutual covers other commands available to the DBMS user and some specifically Adabas-oriented concepts, including the Internal Sequence Number used to locate individual records. Utility functions are discussed at this point, so the student recognizes what the system can and will do for him.

The fifth day adds more detail about Adabas, then swings into a review that encompasses alternative design approaches and specific file alternatives available under this particular data base system.

A final examination is given, and it is graded more at the request of the students' managers than because of the desire of the training team.

The trainers run student critiques, but they know the proof of how much the student got from the course will show up in the success or failure of his own certificate generation project.

If this approach seems somewhat casual, Gillette said, it's because he can't teach the subject by absolute rules. Data base education is gaining an awareness of the trade-offs available; it is not a "this is the way to do it" proposition.

Even users who may never program can gain from attending classes, he said, since – without the training – they often try to design applications without understanding project management. And, in common with so many non-DP types, they do not have specific requirements.

If it's done right, the course taught by people from his own company can help the user bring data base theory and the realities of his functional needs together. Neither the end user nor the DP staff can design a good system unless they know the efficiencies – and the weaknesses – of the DBMS on which the work is to be based, Gillette concluded.

Extra Time Useful For Good Judgment

(Continued from Page S/3)

sure the deterioration of this performance and, therefore, difficult to react to it.

One feature offered by several DBMS is that of data compaction. Normally, one can except the data once stored upon a data base to require anywhere from two to five times the amount of storage as is required to store it in a sequential file. There are some DBMS that offer a compaction feature which manipulates the data so it requires less storage than it normally would have required.

There are also the considerations of multiple partition access and conversion aids. If running in a multiple-partition environment, the ability to access a data base through several partitions may be required.

Finally, conversion aids are important, since one of the largest costs associated with data base will be the process of converting from existing file structures to those supported under data base.

McElreath is a consultant on data base with Keane Associates, Inc. in Wellesley, Mass.

Progress Report:

[illegible] CAN [illegible] YOUR [illegible] DUPLEX IT, BACK IT UP, [illegible] IT TO 4 MEGS, AND SAVE UP TO 40%.

Now?

With Cambridge's new 370/STOR 158-3 add-on [illegible] most models of [illegible] 158 processor, [illegible] versions.

[illegible] in a line of [illegible] the largest [illegible] System/370 [illegible] called [illegible] the world's [illegible] features that go [illegible]. And 370/STOR 158-3 has [illegible] Impredictable [illegible] do more with our [illegible] memory than with anyone else's. For example, your operators can quickly shift either 370/STOR or host IBM memory to off-line status, while the other memory runs. Or you can reconfigure the size of operating memory with just a simple switch setting. Or you can back-up either main memory, or "bump" memory, if you need to do so.

Whether your Model 158 processor is purchased or leased, you can save up to 40 per cent on the memory attached to it. It's as easy as ordering 370/STOR 158-3.

Find out more from your local Cambridge sales office listed below.

CAMBRIDGE.

A great place to put your information.

[illegible] 12 Cagley Drive, Bedford, Mass. 01730 (617) 271-6400
[illegible] Boston (617) 271-6400 • Westport, Conn. (203) 227-7027 • Philadelphia [illegible] Cleveland, O. (614) 868-0154 • Atlanta (404) 252-1382 • Hollywood, Fla. [illegible] New York City (201) 871-0110 • Rochester (716) 637-2410 • Chicago [illegible] D.C. (703) 683-5320 • Dallas (214) 231-4804 • Houston (713) 661-0381 [illegible] (703) 893-1737 • St. Louis, Mo. (314) 822-2212 • Minneapolis (612) 831-1311 [illegible] Von Isenburg, West Germany 06102-36062 • Cambridge Memories AG,

User-Run Training More Easily Shaped to User Needs

(Continued from Page S/4)

completed the assignment and the course.

That sounds simple, he said, but there are a couple of "hookers" in the project and the student coding has to be done in exactly the right sequence or the lines of the certificate will be generated in crazy quilt fashion.

General Introduction

To bring the students to the point where they know how to code the problem, Gillette starts with a general introduction to conventional DP and to DBMS concepts. He utilizes many of the marketing-oriented slides provided by Software AG, but then adds his own material.

Although the Software AG slides or others of similar quality are very nice, he noted, there are cheaper techniques for putting desirable material into audio-visual form. In particular, overhead projector "foils" can be very effective, since one original drawing or chart can be used to create both the transparency and paper copies of the material for student handouts.

To highlight specific points on the slides, color can be added – often using nothing more elaborate than one of the felt-tipped markers that are so common in most offices, Gillette added.

The amount of detail might vary depending on the students' prior knowledge, but the first day would cover the differences between file-oriented DP, in which the required associative techniques tend to be static, and data base operations, where growth naturally occurs in both the type and volume of data and the user community accessing it.

Throughout the course, Gillette said, students are asked a series of multiple-choice questions, with the hope they will get them right. But there is no penalty for wrong answers; the questions are asked so the instructor knows for sure how the individual student is thinking.

The second day of classes at Pacific Mutual gets the students into the basic capabilities of Adabas and the responsibilities of the users. They begin to learn how to define data, how to load it into fields or records under the data base and the basics of updating and retrieval of information once it has been stored.

The instructor proposes two files, one on people, including individual student profiles, and the other on tasks to be completed during class. With utter realism, these include clear definitions of such things as the coffee breaks scheduled each day, the final exam and the problem task.

A handout describes the student file and the students are shown how to reach in and make changes where needed. The student profiles contained some errors and this day's assignment is for each student to put his own records back the way they should be.

Here again, there is another lesson to be learned. The entire student file is insecure, Gillette said, and students can and do tinker with each other's records. The value of data security is made clear even before the subject comes up in class.

Command Usage

The third day of classroom instruction covers command usage under Adabas and at this point the students are given the start of the program with which they can generate their certificates. This skeleton has the certificate print logic, Gillette noted, but not the code needed to extract the personal data from the student's records.

Day four at Pacific Mutual covers other commands available to the DBMS user and some specifically Adabas-oriented concepts, including the Internal Sequence Number used to locate individual records. Utility functions are discussed at this point, so the student recognizes what the system can and will do for him.

The fifth day adds more detail about Adabas, then swings into a review that encompasses alternative design approaches and specific file alternatives available under this particular data base system.

A final examination is given, and it is graded more at the request of the students' managers than because of the desire of the training team.

The trainers run student critiques, but they know the proof of how much the student got from the course will show up in the success or failure of his own certificate generation project.

If this approach seems somewhat casual, Gillette said, it's because he can't teach the subject by absolute rules. Data base education is gaining an awareness of the trade-offs available; it is not a "this is the way to do it" proposition.

Even users who may never program can gain from attending classes, he said, since – without the training – they often try to design applications without understanding project management. And, in common with so many non-DP types, they do not have specific requirements.

If it's done right, the course taught by people from his own company can help the user bring data base theory and the realities of his functional needs together. Neither the end user nor the DP staff can design a good system unless they know the efficiencies – and the weaknesses – of the DBMS on which the work is to be based, Gillette concluded.

Extra Time Useful For Good Judgment

(Continued from Page S/3)

sure the deterioration of this performance and, therefore, difficult to react to it.

One feature offered by several DBMS is that of data compaction. Normally, one can except the data once stored upon a data base to require anywhere from two to five times the amount of storage as is required to store it in a sequential file. There are some DBMS that offer a compaction feature which manipulates the data so it requires less storage than it normally would have required.

There are also the considerations of multiple partition access and conversion aids. If running in a multiple-partition environment, the ability to access a data base through several partitions may be required.

Finally, conversion aids are important, since one of the largest costs associated with data base will be the process of converting from existing file structures to those supported under data base.

McElreath is a consultant on data base with Keane Associates, Inc. in Wellesley, Mass.

Progress Report:

370/158 USERS:

NOW YOU CAN RECONFIGURE YOUR MEMORY, DUPLEX IT, BACK IT UP, EXPAND IT TO 4 MEGS, AND SAVE UP TO 40%.

How?

With Cambridge's new 370/STOR 158-3 add-on memory system that expands most models of the IBM System/370 Model 158 processor, including the new Mod 3 versions.

370/STOR 158-3 is the newest in a line of memories that has made Cambridge the largest independent memory supplier to System/370 processors – with over 250 megabytes installed. That success has been the result of building products with performance features that go beyond the ordinary. And 370/STOR 158-3 has plenty of them.

Features like easy interconnection. Impeccable reliability. The ability to do more with our memory than with anyone else's. For example, your operators can quickly shift either 370/STOR or host IBM memory to off-line status, while the other memory runs. Or you can reconfigure the size of operating memory with just a simple switch setting. Or you can back-up either main memory, or "bump" memory, if you need to do so.

Whether your Model 158 processor is purchased or rented, you can save up to 40 per cent on the memory attached to it. It's as easy as ordering 370/STOR 158-3.

Find out more from your local Cambridge sales office listed below.

CAMBRIDGE.

A good place to put your information.

CM Cambridge Memories, Inc., 12 Crosby Drive, Bedford, Mass. 01730 (617) 271-6400

Contact our sales offices for further information: Boston (617) 271-6400 • Westport, Conn. (203) 227-7027 • Philadelphia (215) 295-1186 • Cleveland (216) 842-2808 • Columbus, O. (614) 459-0154 • Atlanta (404) 252-1382 • Hollywood, Fla. (305) 925-3348 • San Francisco (415) 692-4806 • New York City (201) 871-0110 • Rochester (716) 637-2410 • Chicago (312) 449-5260 • Detroit (313) 557-4080 • Washington, D.C. (703) 683-5323 • Dallas (214) 231-4804 • Houston (713) 661-0381 • Los Angeles (213) 595-1845 • Charlotte, N.C. (704) 568-1787 • St. Louis, Mo. (314) 822-2212 • Minneapolis (612) 831-1311

Subsidiary: Cambridge Memories GmbH, 6078 Neu Isenburg, West Germany 06102-36092 • Cambridge Memories AG, CH 8002 Zurich, Switzerland 00411-253824.

Studied Capabilities First

Small Staff Handles Switch to 'Total' Environment

By Don Leavitt
Of the CW Staff

CHICAGO – There are all sorts of data base horror stories, but sometimes an installation's experience with a data base management system (DBMS) goes so smoothly it seems like a page out of a press agent's book of ideal stories.

That appears to be the situation at John M. Smyth Co., one of the country's largest retailers of quality home furnishings, where DP manager Joseph Stacey recently implemented his first application under Cincom Systems' Total.

Smyth has nine branch stores in Chicago and the nearby suburban area, as well as its main store on "the Loop" in the downtown area. As in most "big-ticket" retail operations, Smyth realized back in 1973 there was a need to modernize its DP techniques to gain better control of inventory status and customer orders and to speed order processing.

The DP department was asked to study the situation and make a recommendation. Stacey attended a seminar on data base and learned at least something about Total, IBM's IMS and a few other DBMS.

Total sounded like something that would fit into what Smyth wanted to do; it seemed easy to handle and that was important to Stacey.

Though there was considerable sentiment to go to on-line operations for both order entry and inquiry, Stacey's proposal was to hold off on that but go to work with a dynamic data base system.

This approach would, he said, eliminate existing redundancy in the company's data, be flexible enough to tie in other applications and have the capability to convert from batch to on-line in the future if that seemed appropriate.

Problems to Surmount

But while data base was judged the proper key to the firm's new system needs, there were obvious problems to overcome. The DP staff was "modest," Stacey said, admitting it consisted of two and sometimes three programmers in addition to his own activities as working manager.

The in-house hardware consisted of an IBM 360/40 with 128K bytes of main

(Continued on Page S/10)

Caution Marks This User's Tests

(Continued from Page S/3)

load "only slowed down the system a bit," Locher said.

To make centralized service work, he added, Home Federal sent Cullinane a copy of the Edos supervisor with its multitasking capability. The IDMS vendor took it from there, writing the code needed to interface Edos and the DBMS, and Bob Goldman of Cullinane "stuck it in the Edos supervisor one night and it was up and running that night."

There were no Edos people at the site when the changes were made, but that was largely because neither Home Federal nor Cullinane saw any need for help from the other vendor.

The Big Test

With the batch tests all but completed, Vehanen and Locher are turning their attention to the evaluation of the IDMS-teleprocessing combination. That's the big test as far as Locher is concerned.

At the end of August, the two-man data base administration team was in the process of organizing a feasibility study which entails checking through all the coding and documentation of all the programs that will be involved to see, ahead of time, what the impact of the DBMS will be.

If that evaluation goes reasonably, Home Federal should be up and testing in a benchmark environment with IDMS and the current teleprocessing software by the end of October or so, Locher estimated.

If it can't make that timetable, the tests will be forced off until January or so, Locher said, so the association can get through its year-end processing, which is a real bottleneck – at an S&L in San Diego, just as in many other installations.

While Home Federal is studying its teleprocessing logic and the applications programs that use it, Cullinane will be modifying whatever it has to in its Generalized Communications Interface (GCI) to work with the association's "home-grown" monitor. Locher indicated this might require some changes in Edos but, as far as he is concerned, that part of the problem is Cullinane's.

Almost all of the association's customer services are on-line now and will be in the DBMS environment. Applications include savings deposits and withdrawals, consumer loans, home mortgages, loans in process (which is part of mortgage accounting) and "unapplied," which is a catchall for all items that can't be handled directly but which are kept in the system to keep it in balance overall.

Home Federal is also considering development of an insurance-related application, but that is still quite a way off, Locher said.

Teleprocessing Conversion

Much closer is conversion of the teleprocessing system from being based inside the association's mainframe to being installed in a separate front-end communications processor. The General Automation SPC-16 mini Home Federal expects to use for this purpose has already been delivered and some recoding has been done.

The teleprocessing staff – about five, out of a total technical staff of about 52 – is covering its bets just as carefully as the data base team has. The system will include a two-way switch so that traffic can go through the front end or through Bram processing in the mainframe.

A changeover to CRT terminals is also in the offing, Locher said, but that is something that will only happen "eventually" and has no impact on the currently planned tests.

File Organization Should Be Matched to Each Situation

By Paul G. Shapin
Special to Computerworld

With the acquisition of a data base management system, the system designer has the power to create a single integrated data base free of all data redundancy.

Now, instead of worrying about how much system integration is possible, the designer must be concerned with how much system integration is desirable.

While integration and the elimination of data redundancy get much play, particularly in sales literature, they are only a means and not the end of systems design. The specific requirements of the system must still be the prime consideration.

For the past 18 months, the Fairfax Hospital Association in Falls Church, Va., has been achieving commendable results in implementing batch and online data base systems without creating an all-encompassing data base or eliminating all of the systems' redundancy. The association's data center has been using Cincom Systems' Total as the data base manager and its companion Environ/I as the teleprocessing monitor.

To date, three systems have been brought up with Total: accounts receivable, patient billing and patient registration.

To Integrate or Not?

The first decision the data center management had to make was whether these systems should use one integrated data base or separate but related data bases. The strongest argument for integration was that the systems used basically the same data and had a close functional relationship.

When a patient is admitted to the hospital, descriptive information about the patient is fed into the on-line registration system through CRTs in the admitting area. In the evening, this same information is passed to the billing system and, shortly after the patient is discharged, the information is deleted from the registration and billing systems and transferred to the accounts receivable system.

In spite of the almost complete redundancy of the patient information in the three systems, it was decided to keep them separate. The primary consideration was the need to make the registration system as efficient as possible.

Once the overall approach had been decided, the individual systems could be designed. The first was accounts receivable.

The primary goal of the design and the reason a redesign was necessary was to reduce the daily runtime, which at six hours was considered unacceptable.

An analysis of the existing system, a modified version of IBM's Shared Hospital Accounting System (Shas), indicated the majority of the runtime was taken up in reorganizing the system's lsam files and in selecting accounts to receive billing statements. The first problem, file reorganization, was automatically solved by the very nature of the Total data base.

The second problem, that of selection for statement printing, required further analysis.

Hospitals differ from many other businesses because only a small part of the accounts receivable (about 20%) are in the billing cycle at any one time. Most accounts are handled by insurance companies which do not get periodic statements.

Of the 20% in the cycle, only 1/21 or about 1% of the whole file is slated to receive a statement on any given day. To find this 1% Shas was reading and checking all 60,000 accounts.

Realizing this, it was decided to link together all accounts scheduled to receive statements on a given day so these accounts could be located more directly.

This design change reduced the daily runtime from six hours under Shas to two and a half hours with Total.

In contrast to the accounts receivable system which accessed a small fraction of the file, the billing system accessed nearly the whole file every night. The need to upgrade the system came not so much because of its runtime (three hours per night) but because of its limited capabilities.

Included in the association's long-range plans is the desire to print bills on demand on-line as patients are being discharged. The existing system was insuffi-

(Continued on Page S/13)

Three-Man Staff Takes 14 Months to Move to 'Total'

(Continued from Page S/8)

memory operating under DOS with 2314 disk packs. There was no possible way of expanding either the equipment or the staff, the manager noted.

That environment limited the number of DBMS packages Stacey could consider and, by February of 1974, Cincom had installed Total on the Smyth system. That was early, as it turned out, but Stacey wanted it on hand because he really didn't know the timeframe in which he might have programs ready for it.

From early on, the staff used its copy of Total to learn about the capabilities and the demands of the system. Smyth generally used ANS Cobol for programming, oriented around Indexed Sequential files before the switch to data base.

In common with many other installations, Smyth's first application under a DBMS was a mixed affair. The company already had an inventory/order entry system, and the new version included much of the basic logic from that old standby.

Stacey did the basic design work and his two and a half programmers made use of the changeover to do a fair bit of resystemizing. "We had to rewrite everything in it to incorporate all the new things we wanted," Stacey said.

Despite the carry-over of old basic logic, "it was like a 100% change, if you come right down to it," he admitted.

The application programming took about 14 months, but that wasn't a full-time effort since both Stacey and his programmers were involved with maintenance work on the production workload still being handled by the 40.

The approach they used on the inventory control/order entry rewrite involved a very big, segmented program to do the data base updating. It took a year to develop, but that was because of all the transaction types going into it and the logic needed to handle them.

There were no real problems with Total during that development cycle, Stacey emphasized.

Contact with Cincom was minimal, he added. The vendor installed its continuing series of "fixes" and answered phone calls from Smyth – "But I'd be surprised if we made more than five calls all year" – to clear up questions of how to approach a situation or exactly how to handle a CALL statement to get the results the company wanted.

The Total side of the development effort was "very simple," Stacey said, adding that if he and his staff had been working in their "normal" Isam environment, "I think we'd still be at it."

Smyth is using Total 7, the latest version. "There may have been problems with earlier versions, but not with ours," Stacey remarked.

In any case, the inventory control/order entry system went into production status May 1 – "just about on schedule" – and is running fine. Sales records are brought into the data center every night and keypunched – "on IBM 129s. They are really nice machines" – for batch processing.

The Model 40 is not partitioned for this operation. The DOS supervisor, Total's functioning modules and the data base update program take up 100K to 105K bytes of the 128K Smyth has. Stacey estimated he handles 3,500 to 4,000 transactions each night "and that averages about a 16-minute run."

On-Line No Strain

Even while that application is going well, Stacey hasn't forgotten the original goals of the requirements study he made in late 1973. The data base he has created can and will be linked to other applications, and the system has the potential to be converted to an on-line operation without major strains.

Accounts payable processing fits right in with the current operations, he said, and in fact his staff has already built several strings of logic related to that application. The present code is general in nature, Stacey said, but when the decision is made to use it and management decides how DP is to handle specific situations, "all we'll have to do is add a couple of data sets to the base and fine-tune the front-end edit routines."

Matchup of invoices and purchase orders and a system of open buys for the buyer when they request purchase orders will probably be in the new application. A control system for accounts receivable would require a change in two files, he went on, and an updated version of the company's current commission system could be added "in three weeks or so."

Other uses remain on the Model 40 in conventional batch mode, including payroll and "a lot of little hotdog jobs that everyone wants – and no one needs."

These are often special little reports that will ultimately be available under the inquiry capabilities of the DBMS.

No Modest Goal

Stacey obviously doesn't go along with those who feel an installation's first DBMS application should be a modest one. Instead, Smyth's approach was to put "the meat of our operation...the heart of our company" in the new environment first.

He also disagrees with those who feel a DBMS-oriented shop has to have a data dictionary or directory to keep track of what it has on the data base. It may be, he thinks, that some DP managers use an automated dictionary "because it's there," just like some mountain climbers.

On-line capability very definitely does interest Stacey, and he expects to go to Total's companion teleprocessing monitor, Environ/I, though he could not – or would not – put a target date on that part of the DBMS story.

"We...definitely want to go that way, with things like merchandise reservations, inquiries about orders and credit authorizations – that's probably going to be our main shot. After that, we'll bring orders directly into the system."

Smyth still feels a lot of indecision on the best way to handle on-line orders. "Do we want to put terminals in the stores – and educate the clerks and others to work with them? Or do we keep the terminals here at headquarters, using them in local mode as an update of keypunching?" Stacey asked.

But the problem isn't as serious as it might seem because Environ/I is designed to work in either mode. With that in mind, Stacey is satisfied his choice of a DBMS meets all the goals of the requirements study he undertook two years ago.

Discover

the one organized (and inexpensive) way to keep up with what's new in computer techniques and management—

The Library of Computer and Information Sciences

and start with
a whale of a value:

Take any 3 books for only $1 each

(values to $57.40)

(If you will join now and take only 3 more books—all at handsome discounts—over the next 12 months.)

(Publisher's Prices Shown)

84385. TOP-DOWN STRUCTURED PROGRAMMING TECHNIQUES. *Clement McGowan and John R. Kelly* Lays out the basic theory and spells out the applications of the powerful new technique. Addressed to experienced programmers, it emphasizes guidelines, techniques, and actual code. **$14.95**

43665. DATA PROCESSING CONTRACTS AND THE LAW. *Richard Burnstein and Gerald Lanzen.* The only full-length work on the topic. Explores plain processing contracts and problems encountered in planning and negotiating contracts, and nine program guidelines for constructing a sound contract. *Figures as 2 of your 3 books.* **$25.00**

59940. MANAGEMENT INFORMATION SYSTEMS. *Paul Siegel.* A wide-ranging and authoritative overview of MIS. Planning, forecasting, modeling, decision-making, establishing MIS roles, and implementation of MIS—are all thoroughly covered. **$16.95**

42980. DOCUMENTATION STANDARDS (Second Edition). *Keith B. Loudon.* Complete guide to the development, design, and implementation of a standard system of documentation. **$12.50**

40021. COMPUTERS: Auditing and Control. *Edited by Elise G. Jancura and Arnold H. Berner* A big book that details every aspect of computer control, data security and evaluation of the results of computerized activities. Forty-four contributions. **$14.95**

64485. OS DATA PROCESSING WITH REVIEW OF OS/VS. *Harry Carroll.* Lays out the many levels of hardware and software that make up a modern system, then unveils the complex interactions among them. Also hammers out in concise review of virtual storage. **$17.50**

70630. PROGRAM TEST METHODS. *Edited by William C. Hetzel.* Provides a complete overview of all the basic methods and techniques used in computer program testing and evaluation—from how to design programs that make testing easy to how to test large software systems. **$12.50**

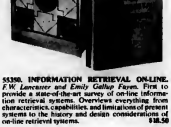
40035. COMPUTER ORGANIZATION AND PROGRAMMING. *C. William Gear.* Newly revised and substantively expanded edition. Reveals the key elements of computer organization, describing the various ways in which the components of the computer are logically connected, the reasons for the different organizations, and the advantages and disadvantages of each. **$16.00**

63008. MODULAR PROGRAMMING IN COBOL. *Russell M. Armstrong.* Offers a precisely defined framework and details guidelines for the implementation of modular cleanly interfaced, and well-documented programs. Treats program quality control, transferability and probability, documentation, and levels of modularity. **$14.50**

55325. INFORMATION SYSTEMS ANALYSIS. *Milton Alexander.* Demonstrates how to evaluate the advantages, limitations, and potential contributions of computerized information systems in decision-making, and gives a much-needed conceptual framework for applying the computer to business problems. **$12.95**

45905. SYSTEMS ANALYSIS FOR BUSINESS DATA PROCESSING! Second Edition. *H. D. Clifton.* This second edition of this classic work—by continuing to stress the practical approach to the analysis and solution of business problems — fills the gap between operational research and business management. **$11.95**

64430. TOWARD CREATIVE SYSTEMS DESIGN. *Henry C. Lucas, Jr.* Advocates a new user-oriented approach to the design and implementation of computer-based information systems. Demonstrates how users (rather than systems analysts) can design their own systems. **$12.00**



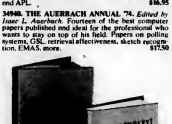
55350. INFORMATION RETRIEVAL ON-LINE. *F.W. Lancaster and Emily Gallup Fayen.* First to provide a state-of-the-art survey of on-line information retrieval systems. Overviews everything from characteristics, capabilities and limitations of present systems to the history and design considerations of on-line retrieval systems. **$18.50**

60405. MANAGING A PROGRAMMING PROJECT. *Philip W. Metzger* Leading you through a typical well-conceived-and-run project, the author spells out what should be considered each step of the way. How to organize, what tools should be used, documentation—these are just a few of the topics examined. **$15.95**

41665. DATA PROCESSING PROJECT MANAGEMENT. *Thomas R. Gildersleeve.* A step-by-step guide to the development of a data processing system. Stressing broadly applicable concepts, it presents a systematic approach to project management. **$14.95**

84325. TIME SHARED COMPUTER LANGUAGES: An Introduction to Conversational Computing. *Lee David Schur.* The only available book to offer thorough coverage of all seven parent time-shared, conversational languages: QUIKTRAN, EXTENDED FORTRAN, BASIC, PL/1, JOSS, CAL, and APL. **$16.95**

34940. THE AUERBACH ANNUAL '74. *Edited by Isaac L. Auerbach.* Fourteen of the best computer papers published and ideal for the professional who wants to stay on top of his field. Papers on polling systems, CRT, retrieval effectiveness, sketch recognition, EMAS, more. **$17.50**



39930. COMPUTERS AND PROGRAMMING: A System/360-370 Assembler Language Approach. *Reino Hannula.* A step-by-step presentation of the Basic Assembler Language for System/360-370, as well as many programming techniques useful in assembler programming. **$14.95**

67765. MINICOMPUTERS: LOW-COST COMPUTER POWER FOR MANAGEMENT. *Donald Kenney.* This practical guide puts in your hands all the information you need to select, buy and operate a complete minicomputer system—with or without access to a large facility. **$13.50**

41630. DATA BASE MANAGEMENT. *William C. Hoare.* A well-founded selection of 35 papers by leaders in the field describing the concepts and the major functions performed by data base systems. A practical user-oriented wide-ranging volume lucidly surveying every important aspect of data processing management. **$19.95**

How the Club Operates • The Book Club News, describing the current Main Selection and Alternate Selections, will be sent to you 15 times a year at 3- to 4-week intervals. • If you would like to choose the Main Selection, do nothing and it will be sent to you automatically. • If you prefer one of the Alternates or no book at all, simply indicate your decision on the reply form always enclosed with the News and mail it so that we receive it by the date specified. • The News is mailed in time to allow you at least 10 days to decide if you want the current Main Selection. If, because of late mail delivery of the News, you should ever receive a Main Selection without having had the 10 day consideration period, the Selection may be returned at our expense. • You may cancel membership after purchasing 3 books (it helps you the added benefit of our Bonus Book Plan.

33440. THE ANATOMY OF A COMPILER. Second Edition. *John A. N. Lee.* New edition of a classic work offers down-to-earth advice and information on syntactic analysis, lexical analysis and SYMTAB, storage allocation and management, and much more. **$17.95**

39950. COMPUTER-AIDED EXPERIMENTATION: Interfacing to Mini-computers. *Jules Finkel.* Unique work stresses the importance of good interface design lays out the basic concepts and techniques needed to specify, design, and use minicomputers in a real-time environment. *Counts as 2 of your 3 books.* **$24.95**

81870. SYSTEMS ANALYSIS: A Diagnostic Approach. *Van Court Hare, Jr.* A full, authoritative examination of this vital new technique. Covers systems definition, systems analysis and diagnosis, and systems treatment. Includes hundreds of challenging examples, problems, and projects. **$13.95**

42305. DISCRETE-TIME SYSTEMS: An Introduction with Interdisciplinary Applications. *James A. Cadzow.* This comprehensive overview of discrete-time systems relates linear systems to such diverse areas as national income, population growth, interest rechains, chemical reactors, and digital filtering. **$18.95**

NO-RISK GUARANTEE: Examine your 3 introductory books for 10 days. If not delighted, simply return them and your membership will be canceled. You pay nothing, owe nothing!

The Library of Computer and Information Sciences 7-94A
Riverside, New Jersey 08075

Please accept my application for membership and send me the 3 books I have listed below at the introductory price of $1 each (plus shipping and handling). Send Selection and Alternates during the first 12 months I am a member under the club plan described in this ad. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments. **Send no money. Members are billed when books arrive.**

3 books for $1 each
(indicate by number the 3 books you want.

A few expensive books (noted in book description) count as 2 choices.

Name _____

Address _____

City _____ State _____ Zip _____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.) Book selections purchased for professional purposes may be a tax-deductible expense.

Concept of Data Resource Management Vital to DBMS

By David Gomes da Costa
Special to Computerworld

Earlier this year, Britain's National Computing Centre published the results of a survey carried out in the U.S., to investigate user experience with a variety of data base management systems (DBMS).

Among the conclusions was a significant paragraph:

". . . . The evolutionary attitude toward implementation of the DBMS seemed to be a very sensible one; by allowing experience within the organization to grow *from simple beginnings* it should be possible to avoid expensive mistakes, and when problems are encountered the necessary expertise will be on hand to deal with them. . . . . "

"To grow from simple beginnings" is important, for it reflects what is now an emerging trend both in the U.S. and Europe.

Data is a resource – as valuable to an organization as its more orthodox human and financial resources. Management decisions are based upon the sometimes erroneous assumption that the supply of information is accurate. But information is based on data.

And data, to provide coherent information, must be managed in a rational manner, just as parts in a parts inventory system – an accepted and indispensable system in the manufacturing environment – are also managed. It is from this notion that the whole concept of data resource management radiates.

But how should data be managed? One school of thought suggests DBMS will provide a solution. Another thinks the data dictionary approach is now becoming more acceptable.

In any case, management should be made aware of how indispensable data management is and the information systems department should be given the right tools for the job.

Data Into Information

The function of the information systems department is essentially to turn data into information. While this was primarily related to accounting operations in the past, the horizons are now much broader and encompass a more fundamental role in the area termed the *management information system.*

In accepting this increased level of responsibility, the information system department must also accept the responsibility of supplying the appropriate information on time, for the value of data to the person or department requiring it decreases with time.

But how well-equipped are most installations to meet this responsibility? How sure are most installations they have full integrity of data?

A change somewhere in a system, a field length for example, can often have unforeseen repercussions on other programs and modules making up that system.

Often management may ask a simple question or request a simple change but because of data inconsistency, the result can cause havoc in the information systems department.

Some widely accepted figures for the UK suggest an average installation spends up to 450 man-weeks a year on systems maintenance. Even an increase in efficiency of only 15% could make for big savings when one considers the real cost of those lost man-weeks.

One path toward better control of an organization's data resource is the establishment of a data base or its next stage, a data base management system.

A DBMS is like a forklift shunting pallets of information around automatically. Once implemented, it does not allow full control to actually see what data is held, how it might be changed or what repercussions such changes might produce.

Data Dictionary

In Europe many organizations are looking at some of the points offered by a data dictionary, a tool which contains data about data in the same way a filing cabinet index holds information about what is held in that filing cabinet.

The data dictionary gives information about data held in the data base or, excluding a DBMS, gives information about the data irrespective of where it is held.

Extensions of a data dictionary's normal facilities can allow full control of data resources. It can be seen to be the foundation stone of a data resource management system (DRMS).

At Management Systems and Programming, we recognized this fact some time ago when developing Datamanager. The central feature of the system is a data dictionary around which revolve a number of facilities designed to give full data control.

At present there are signs that both the UK government and the European Commission in Brussels are pushing hard the requirement that a data dictionary should offer a high degree of portability. That such importance is now being attached to the question of portability is in itself a sign true market requirements are being met.

It is not uncommon for the multinationals, large government departments and universities to have a number of DP sites with a mixed machine shop content. Often they buy through one central purchasing point and it is therefore important that any proprietary software be portable throughout these sites without complex interfacing problems.

For almost the same reason, a user reaching the end of his current hardware range may wish to minimize software problems during the changeover to a possible different computer type. Portability of the software which records the attributes and characteristics of the data may provide a key evaluation criteria in the hardware selection process.

Freestanding Approach

Similar are the problems of companies only part-way through implementing a DBMS. They still have a number of non-DBMS files to maintain and find the inherent inflexibility of a locked-in data dictionary is inadequate; the dictionary is tied in to the data definition language of the relevant DBMS and the need to always run the DBMS whenever the dictionary is run.

For these companies, an external freestanding dictionary would be the answer. Even at its simplest level, such a dictionary can provide information on the data structure of the non-DBMS files, which would ease future full implementation of the whole DBMS.

For software houses developing data dictionaries, the freestanding approach

(Continued on Page S/15)

Technocrats Can Cause Problems

Projects Should Gain From Business-Based Analyses

By Stephen L. Robinson
Special to Computerworld

The era of data base is here, or is it? The sales figures for the major data base packages would certainly seem to indicate that data base has arrived; but do the data base package sales really reflect data base system development? Are the clients of the data base systems (end users, people who receive reports or query the data base) really happier than in predata base days?

In the course of numerous educational and consulting endeavors, it has become clear that the overwhelming majority of data base package users would have to reply "no" to both of the above questions.

Let's briefly explore some of the reasons for these negative responses and, in doing so, indicate actions to avoid these pitfalls.

A large percentage of the data base systems presently being designed and implemented will be no more useful to the data base clients than the file systems they are replacing. In most cases, this is because the new data base systems are not really data base systems at all, but reimplementations of existing file systems using data base packages to provide the access methods.

Before getting mired in terminology, let us distinguish between:

- Data base – any collection of data elements which are relevant to an organization.
- File system – one way to automate a data base, which is characterized by individual files for individual applications (and consequently considerable redundancy) and very little program/data independence (new programs usually necessitate new files since the old files are inconvenient for any processing other than that for which they were designed).
- Data base system – a data base implemented with minimal redundancy and maximal relatability. A community of data organized to serve a community of users (management as well as operational personnel).

Data base systems are a revolutionary way to organize a data base, not an evolutionary descendant of file systems. Data base systems are designed for shared data; file systems are designed for proprietary data. File

(Continued on Page S/16)

File Structure Must Meet Need

(Continued from Page S/9)

cient because it did not maintain the patient charges in chronological order by date of service.

Because of this requirement, a data base was designed that would allow charges to be inserted in the proper order in a chain of charges maintained for each patient.

The result was that the new system provided for the capability of printing bills on-line at the cost of increasing the batch runtime of the system by one hour.

The requirements of the third system, the registration system, were that the system provide efficient on-line access to the patient master file, produce a variety of batch reports on the in-house patient population and be available on-line for as close to 24 hours a day as possible.

The system thus required random processing to satisfy the on-line requirements and sequential processing to satisfy the batch requirements.

The system design followed a technique that has been used on several applications developed in the data center and by several other Total users. The system was designed to optimize the random on-line functions with disregard to the efficiency of the batch functions.

To handle the batch requirements, a utility program serially reads the Total file and creates a sequential file which is then used in a traditional fashion to produce any necessary reports.

The result of this approach allowed an efficient on-line system to be designed which required the on-line files be taken off-line only 10 minutes a day. Not surprisingly, the batch runtime of the system remained unchanged from that of the sequential system.

In all of the systems the desired results were achieved because primary consideration was given to the specific systems requirements and how the information within the systems actually related, rather than to achieving the abstract goals of total integration or elimination of redundancy.

Shapin is programming manager at the Fairfax Hospital Association Data Center, Falls Church, Va.

Concept of Data Resource Management Vital to DBMS

By David Gomes da Costa
Special to Computerworld

Earlier this year, Britain's National Computing Centre published the results of a survey carried out in the U.S., to investigate user experience with a variety of data base management systems (DBMS).

Among the conclusions was a significant paragraph:

". . . . The evolutionary attitude toward implementation of the DBMS seemed to be a very sensible one; by allowing experience within the organization to grow *from simple beginnings* it should be possible to avoid expensive mistakes, and when problems are encountered the necessary expertise will be on hand to deal with them. . . . . ."

"To grow from simple beginnings" is important, for it reflects what is now an emerging trend both in the U.S. and Europe.

Data is a resource – as valuable to an organization as its more orthodox human and financial resources. Management decisions are based upon the sometimes erroneous assumption that the supply of information is accurate. But information is based on data.

And data, to provide coherent information, must be managed in a rational manner, just as parts in a parts inventory system – an accepted and indispensable system in the manufacturing environment – are also managed. It is from this notion that the whole concept of data resource management radiates.

But how should data be managed? One school of thought suggests DBMS will provide a solution. Another thinks the data dictionary approach is now becoming more acceptable.

In any case, management should be made aware of how indispensable data management is and the information systems department should be given the right tools for the job.

Data Into Information

The function of the information systems department is essentially to turn data into information. While this was primarily related to accounting operations in the past, the horizons are now much broader and encompass a more fundamental role in the area termed the management information system.

In accepting this increased level of responsibility, the information system department must also accept the responsibility of supplying the appropriate information on time, for the value of data to the person or department requiring it decreases with time.

But how well-equipped are most installations to meet this responsibility? How sure are most installations they have full integrity of data?

A change somewhere in a system, a field length for example, can often have unforeseen repercussions on other programs and modules making up that system.

Often management may ask a simple question or request a simple change but because of data inconsistency, the result can cause havoc in the information systems department.

Some widely accepted figures for the UK suggest an average installation spends up to 450 man-weeks a year on systems maintenance. Even an increase in efficiency of only 15% could make for big savings when one considers the real cost of those lost man-weeks.

One path toward better control of an organization's data resource is the establishment of a data base or its next stage, a data base management system.

A DBMS is like a forklift shunting pallets of information around automatically. Once implemented, it does not allow full control to actually see what data is held, how it might be changed or what repercussions such changes might produce.

Data Dictionary

In Europe many organizations are looking at some of the points offered by a data dictionary, a tool which contains data about data in the same way a filing cabinet index holds information about what is held in that filing cabinet.

The data dictionary gives information about data held in the data base or, excluding a DBMS, gives information about the data irrespective of where it is held.

Extensions of a data dictionary's normal facilities can allow full control of data resources. It can be seen to be the foundation stone of a data resource management system (DRMS).

At Management Systems and Programming, we recognized this fact some time ago when developing Datamanager. The central feature of the system is a data dictionary around which revolve a number of facilities designed to give full data control.

At present there are signs that both the UK government and the European Commission in Brussels are pushing hard the requirement that a data dictionary should offer a high degree of portability. That such importance is now being attached to the question of portability is in itself a sign true market requirements are being met.

It is not uncommon for the multinationals, large government departments and universities to have a number of DP sites with a mixed machine shop content. Often they buy through one central purchasing point and it is therefore important that any proprietary software be portable throughout these sites without complex interfacing problems.

For almost the same reason, a user reaching the end of his current hardware range may wish to minimize software problems during the changeover to a possible different computer type. Portability of the software which records the attributes and characteristics of the data may provide a key evaluation criteria in the hardware selection process.

Freestanding Approach

Similar are the problems of companies only part-way through implementing a DBMS. They still have a number of non-DBMS files to maintain and find the inherent inflexibility of a locked-in data dictionary is inadequate; the dictionary is tied in to the data definition language of the relevant DBMS and the need to always run the DBMS whenever the dictionary is run.

For these companies, an external freestanding dictionary would be the answer. Even at its simplest level, such a dictionary can provide information on the data structure of the non-DBMS files, which would ease future full implementation of the whole DBMS.

For software houses developing data dictionaries, the freestanding approach

(Continued on Page S/15)

Technocrats Can Cause Problems

Projects Should Gain From Business-Based Analyses

By Stephen L. Robinson
Special to Computerworld

The era of data base is here, or is it? The sales figures for the major data base packages would certainly seem to indicate that data base has arrived; but do the data base package sales really reflect data base system development? Are the clients of the data base systems (end users, people who receive reports or query the data base) really happier than in predata base days?

In the course of numerous educational and consulting endeavors, it has become clear that the overwhelming majority of data base package users would have to reply "no" to both of the above questions.

Let's briefly explore some of the reasons for these negative responses and, in doing so, indicate actions to avoid these pitfalls.

A large percentage of the data base systems presently being designed and implemented will be no more useful to the data base clients than the file systems they are replacing. In most cases, this is because the new data base systems are not really data base systems at all, but reimplementations of existing file systems using data base packages to provide the access methods.

Before getting mired in terminology, let us distinguish between:

- Data base – any collection of data elements which are relevant to an organization.
- File system – one way to automate a data base, which is characterized by individual files for individual applications (and consequently considerable redundancy) and very little program/data independence (new programs usually necessitate new files since the old files are inconvenient for any processing other than that for which they were designed).
- Data base system – a data base implemented with minimal redundancy and maximal relatability. A community of data organized to serve a community of users (management as well as operational personnel).

Data base systems are a revolutionary way to organize a data base, not an evolutionary descendant of file systems. Data base systems are designed for shared data; file systems are designed for proprietary data. File

(Continued on Page S/16)

File Structure Must Meet Need

(Continued from Page S/9)

cient because it did not maintain the patient charges in chronological order by date of service.

Because of this requirement, a data base was designed that would allow charges to be inserted in the proper order in a chain of charges maintained for each patient.

The result was that the new system provided for the capability of printing bills on-line at the cost of increasing the batch runtime of the system by one hour.

The requirements of the third system, the registration system, were that the system provide efficient on-line access to the patient master file, produce a variety of batch reports on the in-house patient population and be available on-line for as close to 24 hours a day as possible.

The system thus required random processing to satisfy the on-line requirements and sequential processing to satisfy the batch requirements.

The system design followed a technique that has been used on several applications developed in the data center and by several other Total users. The system was designed to optimize the random on-line functions with disregard to the efficiency of the batch functions.

To handle the batch requirements, a utility program serially reads the Total file and creates a sequential file which is then used in a traditional fashion to produce any necessary reports.

The result of this approach allowed an efficient on-line system to be designed which required the on-line files be taken off-line only 10 minutes a day. Not surprisingly, the batch runtime of the system remained unchanged from that of the sequential system.

In all of the systems the desired results were achieved because primary consideration was given to the specific systems requirements and how the information within the systems actually related, rather than to achieving the abstract goals of total integration or elimination of redundancy.

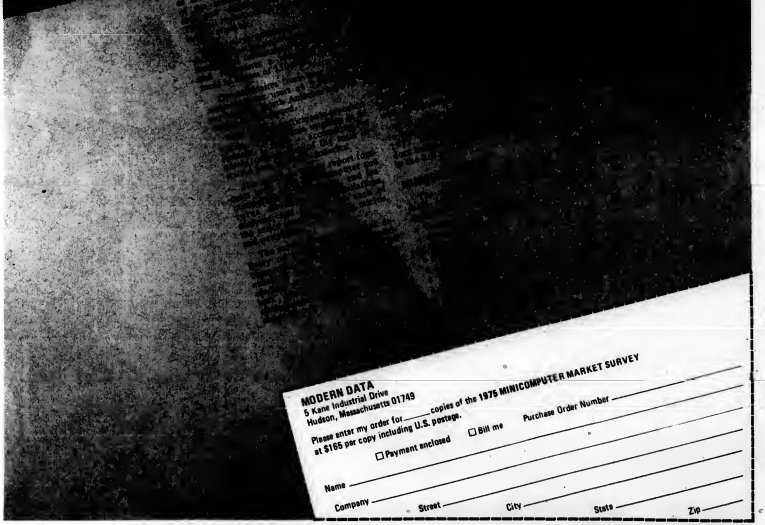
Shapin is programming manager at the Fairfax Hospital Association Data Center, Falls Church, Va.

1975 MINICOMPUTER SALES TO HIT $1.24 BILLION

Unit Shipments To Reach 55,400 Machines

Floppy disk drives, line printers, add-on memories cited as top miniperipheral growth areas for 1975.

Microprocessor sales to OEM's and systems houses to reach 700,000 units. Less than 20% of the micros will be used in lieu of minicomputers.



MODERN DATA
5 Kane Industrial Drive
Hudson, Massachusetts 01749

Please enter my order for ____ copies of the **1975 MINICOMPUTER MARKET SURVEY** at $165 per copy including U.S. postage.

☐ Payment enclosed ☐ Bill me Purchase Order Number _____

Name _____

Company _____ Street _____ City _____ State _____ Zip _____

Administrator, Users and DBMS Have to Work Together

(Continued from Page S/5)

scription language (DDL) the rules by which the DBMS can develop logical data strings from the physical data. The DBA should describe these rules for each application that uses the data base.

The logical data presentation should be composed of logical structures, records and elements. This variety is one of the means by which data independence is provided in a data base environment.

Through the DDL, the DBA should define the various levels of authority a user may be given to have access to system resources, data descriptors and actual data from the data base.

Restrictions and limitations in updating, retrieving, deleting or inserting new values in the data base should be defined by the DBA based on the function of each application.

The mnemonic names of all data elements and their logical definitions should be entered in some sort of data dictionary, which can be a manual operation but is usually run through a data base utility program.

In any case, this dictionary is a vital facility through which the uniqueness and the integrity of the data elements can be preserved.

The physical data organization specified by the DDL and included in the full data dictionary may include record layouts, data set descriptions, data element integrity specifications and physical relationships. This information is used by the DBMS to build a user-defined data base, even though the physical layout of the data becomes irrelevant to the application programmer in a data base setting.

Accessing and updating of the data dictionary should be the function of the DBA, and he alone should be entrusted with the authority to perform such actions.

The independence in the use of the data in a logical application should not be determined — or constrained — by the physical structure of the data. It should be noted that the format, structure and size of the data base and its content can be changed at any time it is needed, and this is done by the DBA with little or no effect upon existing applications.

Recovery Major Concern

In a data base environment, the need for recovering data upon a system failure has become a major concern of all data base designers. Today, in almost all DBMS packages, the system programmer can and should incorporate any facilities available to him to ease such recovery.

The choice of features varies from one DBMS to another, but generally the facilities available include data base load and recovery, data base dump/restore, data base recovery and data base system log analysis. Based on empirical studies, it is recommended implementation and testing of these features should be still another task assigned to the DBA.

One way or another, the DBA should have these facilities available and invoke them in such a manner that they are easy to use and can provide rapid means of restoring a destroyed data base.

The options available to the DBA should enable him to encourage, impose and indeed require a degree of discipline on the part of the users of the data base.

The above was adapted from a piece appearing in the January 1975 issue of DB/DC Newsletter *published by On-Line Software International.*

Renamed the Telesystems Journal *since this article appeared, the publication is published every other month and is available on subscription for $35/year from On-Line at Continental Plaza, 411 Hackensack Ave., Hackensack, N.J.*

Management Needed For Data Resources

(Continued from Page S/12)

offers many obvious advantages. The main one is, of course, the size of the potential market. Portability means the dictionary can be implemented by any user irrespective of the state of his hardware and any DBMS he may already have.

Size of market must be the paramount consideration. Dictionary development costs can be high and vendors need large markets in order to amortize these costs. Thus far, for example, development costs for Datamanager have exceeded $600,000.

As companies such as MRI Systems Corp., Cincom Systems, Inc. and of course, IBM push ahead with their own DBMS versions, they are also opening up other marketing areas — areas of potential data dictionary implementation.

They are helping companies focus attention on the consequences of mismanaged corporate data, thereby making companies aware of the need for a DBMS which encompasses, envelops the DBMS.

If DBMS sales are one reflection of the number of companies now examining the whole question of data base management, then they too could be an indicator of future data dictionary market prospects, a point enhanced by the cost-saving advantage dictionaries have over DBMS.

Straw in the Wind

This year's survey by International Computer Programs (ICP) could provide a straw in the wind. The list of software products whose sales have topped the million dollar mark showed two DBMS have done exceptionally well.

MRI Systems Corp. with its System 2000 held a healthy place in the $5 million bracket. Cincom's Total came in the big over-$20 million bracket. This was particularly significant because there were only three other software products in that category.

As a European I found the ICP survey also markedly showed one other significant point: only one European software product was mentioned — the DBMS Adabas from Software AG. Such a low presence cannot go without mention.

One must ask, "What is the comparative state of the art between the U.S. and Europe?" At present it seems the U.S. is well ahead. But there are signs that this lead could change.

Through the European Commission, funds are now being made available to the software industry, and national governments too are aware of the American challenge. It is a question of whether it will be too little too late.

Gomez da Costa is managing director of Management Systems and Programming Ltd. in London.

1975 MINICOMPUTER SALES TO HIT $1.24 BILLION

Unit Shipments To Reach 55,400 Machines

Floppy disk drives, line printers, add-on memories cited as top miniperipheral growth areas for 1975.

Microprocessor sales to OEM's and systems houses to reach 700,000 units. Less than 20% of the micros will be used in lieu of minicomputers.

These are the major conclusions of MODERN DATA's 1975 survey of the minicomputer, miniperipheral and microprocessor market. The full report of the survey results is now available.

This fourth annual survey is the most exhaustive and comprehensive study ever undertaken in this field and represents a research investment in excess of $50,000.

Questionnaires from over 5,000 minicomputer users at 3,500 sites throughout North America were received and analyzed.

The survey participants reported having 27,000 minis in place as of January 1, 1975 — accounting for nearly one-quarter of the total installed base in North America.

The complete survey report forecasts total 1975 minicomputer and miniperipheral shipments, and features detailed cross-tabulations, analyses, and profiles for each of the major vendors of minis, micros, and peripherals.

The survey respondents took delivery on more than 18,000 minicomputers in 1974 at a reported value of nearly $400 million (including peripherals). The respondents' purchase plans for 1975 include larger quantities and higher expenditures.

MICROPROCESSORS

Over one-third of the 3,500 organizations represented in the survey reported an active interest in microprocessors and/or microcomputers. Of the organizations building products with micros, 48% are still in R&D, 31% are designing, and 21% are now buying micros. The firms planning to use them indicated they will use them . . .

Instead of hard-wired logic.....(45%)
For new applications (not previously implemented with electronics).....(36%)
Instead of minicomputers.....(19%)

The respondents reported plans to buy 193,000 microprocessors in 1975. The applications and the vendors being considered are tabulated in the full report.

MINIPERIPHERALS

The report charts the percent share of 1975 orders for all the major vendors of . . .

- Magnetic tape transports
- Cassette tape transports
- Disk drives
- Floppy disks
- Line printers
- Teleprinters
- Digital plotters
- Paper tape units
- A to D, D to A converters
- Add-on memories

INSTALLED BASE

This year's report features an analysis of the installed population of minicomputers based on SIC codes. Also featured are analyses of the installed base by make and model numbers, applications, OEM/end user mix, and geographic distribution.

TO ORDER

To order your copy of the 1975 survey report, fill in the coupon and clip it to your letterhead or company purchase order. No telephone orders accepted.

MODERN DATA
5 Kane Industrial Drive
Hudson, Massachusetts 01749

Please enter my order for _____ copies of the **1975 MINICOMPUTER MARKET SURVEY** at $165 per copy including U.S. postage.

☐ Payment enclosed ☐ Bill me Purchase Order Number _____

Name _____

Company _____ Street _____ City _____ State _____ Zip _____

Administrator, Users and DBMS Have to Work Together

(Continued from Page S/5)

scription language (DDL) the rules by which the DBMS can develop logical data strings from the physical data. The DBA should describe these rules for each application that uses the data base.

The logical data presentation should be composed of logical structures, records and elements. This variety is one of the means by which data independence is provided in a data base environment.

Through the DDL, the DBA should define the various levels of authority a user may be given to have access to system resources, data descriptors and actual data from the data base.

Restrictions and limitations in updating, retrieving, deleting or inserting new values in the data base should be defined by the DBA based on the function of each application.

The mnemonic names of all data elements and their logical definitions should be entered in some sort of data dictionary, which can be a manual operation but is usually run through a data base utility program.

In any case, this dictionary is a vital facility through which the uniqueness and the integrity of the data elements can be preserved.

The physical data organization specified by the DDL and included in the full data dictionary may include record layouts, data set descriptions, data element integrity specifications and physical relationships. This information is used by the DBMS to build a user-defined data base, even though the physical layout of the data becomes irrelevant to the application programmer in a data base setting.

Accessing and updating of the data dictionary should be the function of the DBA, and he alone should be entrusted with the authority to perform such actions.

The independence in the use of the data in a logical application should not be determined – or constrained – by the physical structure of the data. It should be noted that the format, structure and size of the data base and its content can be changed at any time it is needed, and this is done by the DBA with little or no effect upon existing applications.

Recovery Major Concern

In a data base environment, the need for recovering data upon a system failure has become a major concern of all data base designers. Today, in almost all DBMS packages, the system programmer can and should incorporate any facilities available to him to ease such recovery.

The choice of features varies from one DBMS to another, but generally the facilities available include data base load and recovery, data base dump/restore, data base recovery and data base system log analysis. Based on empirical studies, it is recommended implementation and testing of these features should be still another task assigned to the DBA.

One way or another, the DBA should have these facilities available and invoke them in such a manner that they are easy to use and can provide rapid means of restoring a destroyed data base.

The options available to the DBA should enable him to encourage, impose and indeed require a degree of discipline on the part of the users of the data base.

The above was adapted from a piece appearing in the January 1975 issue of DB/DC Newsletter *published by On-Line Software International.*

Renamed the Telesystems Journal *since this article appeared, the publication is published every other month and is available on subscription for $35/year from On-Line at Continental Plaza, 411 Hackensack Ave., Hackensack, N.J.*

Management Needed For Data Resources

(Continued from Page S/12)

offers many obvious advantages. The main one is, of course, the size of the potential market. Portability means the dictionary can be implemented by any user irrespective of the state of his hardware and any DBMS he may already have.

Size of market must be the paramount consideration. Dictionary development costs can be high and vendors need large markets in order to amortize these costs. Thus far, for example, development costs for Datamanager have exceeded $600,000.

As companies such as MRI Systems Corp., Cincom Systems, Inc. and of course, IBM push ahead with their own DBMS versions, they are also opening up other marketing areas – areas of potential data dictionary implementation.

They are helping companies focus attention on the consequences of mismanaged corporate data, thereby making companies aware of the need for a DBMS which encompasses, envelops the DBMS.

If DBMS sales are one reflection of the number of companies now examining the whole question of data base management, then they too could be an indicator of future data dictionary market prospects, a point enhanced by the cost-saving advantage dictionaries have over DBMS.

Straw in the Wind

This year's survey by International Computer Programs (ICP) could provide a straw in the wind. The list of software products whose sales have topped the million dollar mark showed two DBMS have done exceptionally well.

MRI Systems Corp. with its System 2000 held a healthy place in the $5 million bracket. Cincom's Total came in the big over-$20 million bracket. This was particularly significant because there were only three other software products in that category.

As a European I found the ICP survey also markedly showed one other significant point: only one European software product was mentioned – the DBMS Adabas from Software AG. Such a low presence cannot go without mention.

One must ask, "What is the comparative state of the art between the U.S. and Europe?" At present it seems the U.S. is well ahead. But there are signs that this lead could change.

Through the European Commission, funds are now being made available to the software industry, and national governments too are aware of the American challenge. It is a question of whether it will be too little too late.

Gomes da Costa is managing director of Management Systems and Programming Ltd. in London.

Business Analysts Would Calm Fears of Non-DP User

(Continued from Page S/13)

systems are designed for individual application efficiency; data base systems are designed for the overall efficiency of all applications which share the data base.

Data base packages provide the basic mechanisms to implement data base systems, i.e., store records, relate records, retrieve records. These basic mechanisms, however, are also the building blocks for file systems. The difference between data base systems and file systems is in the overall philosophy of design, not the implementation tools.

The advent of data base packages has opened the world of data base systems to the vast world of users who were reluctant to attempt data base system implementation on their own. (for a variety of good reasons, including lack of expertise, time'constraints, budget limitations, etc).

Unfortunately, the opportunity to develop data base systems is not being seized in most organizations. To some extent, management can be blamed.

Management (non-DP, but oftentimes DP as well) views data base as a package, not as a design philosophy. They are accustomed to purchasing/leasing software, so they fit data base into this niche. Software acquisitions follow standard patterns; the software is installed, the new system is run in parallel with the old systems for a couple of months, and then the new system is on its own.

Management passes the word that the DP department may buy a data base package and expects the payroll system to be running under the data base in three months.

The consequences of such an edict are clear. The only way the payroll system can be running under the data base package in three months is if the files created for the data base system closely resemble (if not duplicate) the files from the present file system. In this manner, the payroll application programs may survive the transition virtually intact.

Subsequently, the personnel system is reimplemented using the data base package. Since the payroll system was designed as a stand-alone, the personnel system designers find it inconvenient to share data with the payroll system. Personnel becomes a stand-alone system.

The data base effort picks up steam, and the process is reiterated during the redesign of the vast majority of the systems. the result is a file system built with a data base package.

True, there will probably have been some consolidation of files and, consequently, some reduction in redundancy; however, the end result is usually still a file system, not a data base system.

Logical subsets of a corporate data base must be designed in toto before work begins on any of the individual applications. By a logical subset is meant a set of data elements with little, if any, interaction with other logical subsets.

Many organizations are unwilling to invest the initial time and effort required to design a true data base system, or they are not aware of the consequences of such frugality. Such organizations are now paying the price; they are discovering their "data base systems" are not providing more information quicker and more accurately than their old file systems. Some of these organizations are coming to realize this is because they still have their old file systems, albeit in a different form.

Data base administrators must educate management in the difference between data base technology and data base packages. Only then can they justify the effort involved in data base system development.

Users vs. Computer Analysts

The large number of reports in existing file systems, which are filed before being read, bear mute testimony to the schism (chasm might be more appropriate) which exists between data processing personnel and the user community. The source of a large percentage of user dissatisfaction is the computer analyst (program analyst, project analyst or other names employed by disgruntled users).

The computer analyst is usually just that, a computer programmer who excelled at his position and was rewarded by being promoted to what ostensibly is another computer-oriented position, computer analyst.

Unfortunately, the analyst soon discovers the job does not revolve solely around the computer. He is now expected to talk to users and help design systems which reflect their requirements. This is oftentimes not within the analyst's area of expertise or interest.

Rather than admit failure, since programmers may have nowhere to go but into any analyst spot, the programmer/analyst proceeds to design a system employing data storage, organization and retrieval techniques that he deems interesting.

In the past, the result was usually a system which was not what the user wanted, but, thankfully, it was only one system. With luck, none of the file systems were user-oriented, despite the efforts of the program analyst to create a system which he thought would be useful.

Data base technology provides the computer analyst with a plethora of new techniques to experiment with. Full inversions, partial inversions, hierarchies, sets, randomizing; the computer analyst is in seventh heaven.

The users, however, may be worse off than before. A data base system may transcend many, if not all, of the major functional areas in an organization. Consequently, the computer analyst now has an opportunity to create numerous non-user-oriented systems.

What is required is a reinstitution of the job classification of business analyst.

A business analyst is someone who studies business procedures, both automated and nonautomated. In addition, the business analyst works with operational personnel and management to improve the existing business procedures. This activity spans a wide gamut of tasks, from redesigning a form or report to requesting an on-line inquiry system.

The business analyst's first responsibility is to the personnel involved in the business activity under study. It is not necessary for the business analyst to have any DP knowledge beyond that required to communicate effectively with the computer analyst.

Robinson is director of professional development at Performance Development Corp. in Trenton, N.J.

Nature of Corporation Decides

Centralization or Decentralization: Which is Best?

By Eric A. Weiss
Special to Computerworld

Which are best, centralized or decentralized DP facilities?

There is no clear answer. Economy of scale is the most common argument for centralized DP operations. Advocates of decentralization stress the need to make DP more responsive to the user.

The most important factor in the choice between centralization and decentralization, however, is the organization and management philosophy of the company.

Sun Oil Co. changed from a decentralized to a centralized form of DP activity because the practices, philosophies and organizational principles of the parent company had changed.

In 1968, Sun Oil and Sunray DX Oil Co. merged. The resulting company had 34 computers in 21 locations from Philadelphia to Dallas managed by 15 different administrative organizations.

This approach to DP organization reflected a management philosophy which encouraged decentralized operation and local control of facilities.

Review Brought Change

Immediately after the legal merger, a major review was instituted of the company as a whole and of each major function.

The key organizational recommendation in the systems and computers area was that the company's computer system resources should be grouped together into an in-house service bureau having the responsibility for all computer hardware and all full-time systems analysts, programmers and operators.

The corporate systems manager was to report to a corporate officer. A separate corporate systems planning group was to report to the same corporate officer, and each major operating function should have a separate systems planning group reporting "in line" to its own functional executive.

In addition to the organizational recommendations, the project team made recommendations relating to policies and procedures. It suggested improved processes be developed for selecting and planning projects and for acquiring allocation resources. Another recommendation was that the recommended organization operate under a set of formal, documented policies and procedures. Major functional users should be consulted when computer systems policies and procedures are developed or modified, it also said.

The organizational outcome of this was the Systems and Computers Division. It managed all computing hardware, including selection, acquisition and operation; all systems analysis and development; and all telecommunications.

The dispersed, DP-related groups were drawn together into a single administrative unit. Three parallel efforts were set in motion.

- The exploration of the technical, operational and economical feasibility of combining all the computer hardware into fewer than 21 centers.
- The start of the creation of the necessary policies, procedures and standards.
- The start of the development of processes and organizational arrangements for selecting, planning and carrying out systems development projects.

The firm has reached a consolidated situation today in the form of a wholly owned operating subsidiary of the Sun Oil Co., Sun Services Corp.

Hardware is consolidated into a single site in a specially built-for-the-purpose building in Dallas, completed this July. The movement of hardware into it has been proceeding since then and will be completed later this fall. When it is completed, there will be two IBM 370/168s in a single building. All input/output will be done by remote terminals connecting to all the locations which use computers.

Benefits Achieved

By this consolidation of hardware, Sun Oil will have achieved a general-purpose environment with calculations of all kinds in intermingled loads on the same computer; central control over the operation of the computer facility as a factory; and physical consolidation of the files, making technically feasible the integration of systems and data bases across various departments and portions of the company. Other benefits include a higher utilization of computers, an economy of scale, reduced redundancy of data and effort and standard procedures and systems. Lower costs in the areas of reliability, physical and data security and privacy protection were also achieved.

In addition to consolidating the hardware, the merger team recommendation involved the centralized control of the systems development function. At first, all systems analysts and programmers were administratively transferred to the centralized Systems and Computers Division.

Then appropriate organizational groupings were made and associated with the users they supported.

Finally, over a long period of time, the policies, procedures, standards and processes required for systems analysis and development, were gradually created and installed.

Sun Services now has a core of policies, procedures and standards which apply to all its activities; which gave interchangeability of data, programs and people; and which generally provide that if a better way is known it is broadly applied.

(Continued on Page 31)

Same Basic Principles Apply To All Kinds of DP Operations

Whether a DP operation is centralized or decentralized, there are certain basic principles that apply, according to Eric A. Weiss, manager of planning and administration for Sun Services Corp.

One of these essential points is that planning, long-range and short-range, must consider the technology, the anticipated changes in the business served and anticipated changes in the DP business. Data processing plans must incorporate user plans.

Also, in deciding whether to implement anything new, management must consider technical feasibility, economic feasibility and operational feasibility. In other words, will it work, will it pay and will it be used? A failure to satisfy any one of these requirements will always result in a failure of the newly installed system, Weiss said.

Remember to include telecommunications if the service must be rendered over a wide geographical range, he added.

Systems development must be seen as engineering, similar in all respects to the design, creation and installation of a plant or a process. It is thus subject to the same kinds of planning, programming and control.

Another point is that the user is responsible for benefits. He must identify the benefits and later be held responsible by management for producing the benefits of the system, Weiss said.

Remember, too, that operation is production. The operation of computers is a factory or production operation and not a research function or a design-engineering function.

Customer orientation is another important consideration. Special arrangements have to be made to focus on the needs and requirements of the customer.

"In data processing we have few standards of the kind which are common and well accepted in the engineering disciplines. We must create many of them and enforce them internally while we wait for the world at large to develop them and the educational world to impart them to students.

"Of these essentials, the first, planning, and the last, standards, are most easily controlled and enforced by a centralized activity. But once they are controlled and enforced, once all important executives and most of the data processing community in the corporation and the user communities have accepted them as essential and necessary, one can no longer use these as an argument for total centralization," Weiss said.

I/O System Links to 360s, 370s

POMPANO BEACH, Fla. – The Mark IV Input/output subsystem from Southern Systems, Inc. (SSI) includes a processor/controller that can link up to 23 line printers, card readers, card punches and other peripherals to IBM 360/370 CPUs.

The I/O system's master control unit (MCU) attaches to either a selector or multiplexer channel. Data transfers may occur in the burst mode, control unit forced burst mode or single-byte multiplex mode.

The user adds a peripheral to the I/O subsystem by including a software handler in the MCU and adding a hardware controller. In addition to the MCU operating software, SSI provides diagnostic software for the MCU and each of the peripheral devices.

The standard MCU can support six peripherals, and an expansion module supports seventeen more. The MCU concept allows two or more of the same peripherals to be added to a 360 or 370 CPU, SSI said.

SSI Peripherals

Among the peripherals SSI will supply are 300-, 600- and 1,500 line/min printers; 300-, 600- and 1,000 card/min readers; and a 100- to 285 card/min punch.

SSI also offers a card reader/punch module and paper tape reader modules and three types of CRTs.

The basic MCU controller costs $13,000. The printer prices range from $11,000 to $32,000, and the card readers cost from $4,500 to $8,000.

The card punch module costs $15,000 and the reader/punch module costs $16,500. The paper tape reader module costs $1,500. The CRT modules cost from $3,500 to $7,000.

SSI is at 1011 Southeast Ave., 33060.

Invest in yourself this fall.

Announcing the EDP Seminar Series Fall Schedule

The world of EDP is caught up in a continuous revolution. It's only 24 years since the first business computer made its appearance, and we've gone from tubes, batch processing and single-site giants to multiprogramming, time sharing, data communications, giant minicomputers and hundreds of other technological innovations that were unheard of only recently. Keeping up with this revolution is difficult, to say the least. And that's why we've created the EDP Seminar Series.

The EDP Seminar Series gives you practical applications of the newest advances in computer management. What you learn will save you time and money, because each course is geared to practical dollars and sense application.

Remember, these are seminars, not lectures, and you'll be learning by doing in a shirtsleeve atmosphere. Workshops are an important feature of the Seminars, and round table discussions and shop talk luncheons complement the seminar presentations. The workbooks and course materials are yours to keep, so you'll always have a handy reference to all you've learned.

We've selected leading experts from around the country to guide each of our Seminars. They are highly accomplished specialists in their fields, experienced in presenting their techniques to industry and management. If you're involved in one of the areas shown, you should attend the EDP Seminar Series this fall. What you learn will benefit your company, your installation, and you.

Data Communications Course #1010 – Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

San Diego	**Plaza Int'l Hotel**	**Sept. 29-30**
New York	**St. Moritz**	**Oct. 13-14**
San Francisco	**Dunfey's Royal Coach**	**Oct. 20-21**
Dallas	**Hilton Inn**	**Nov. 10-11**
Miami	**Marriott Miami Beach**	**Nov. 17-18**

Data Communications Course #1020 – Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

Miami	**Holiday Inn Airport Lakes**	**Dec. 1-3**

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

New York	**Summit Hotel**	**Oct. 22-24**
San Francisco	**Hyatt Regency San Francisco**	**Nov. 12-14**
Chicago	**Hyatt Regency O'Hare**	**Nov. 19-21**

How to Draft Effective Legal Agreements

This one-day seminar is a complete workshop for non-legal, technical people who may be called upon to draft legal agreements for their company. Also led by Roy Freed, this seminar covers a variety of formal agreements, their structure and the legal factors involved. You'll have all the basic skills necessary to write legal agreements, and you'll be able to spot items that really require the attention of lawyers.

Cost for the seminar, including luncheon and a complete workbook on the subject, is $135.

New York	**St. Moritz**	**Oct. 8**
Boston	**Sheraton**	**Oct. 15**

Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more.

Cost for the seminar, including course materials, continental breakfasts and luncheons is $350. Additional registrants from the same company qualify for a reduced rate of $300.

New York	**St. Moritz**	**Sept. 22-24**
Denver	**Denver Hilton**	**Dec. 1-3**

Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

New York	**Summit Hotel**	**Sept. 29-30**
Wash., D.C.	**Marriott at Wash. Int'l. Airport**	**Oct. 20-21**
Chicago	**Hyatt Regency O'Hare**	**Oct. 27-28**
San Francisco	**Dunfey's Royal Coach**	**Jan. 19-20**

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams.

Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

New York	**St. Moritz**	**Oct. 6-7**
San Francisco	**Berkeley Marriott**	**Nov. 10-11**

EDP SEMINAR SERIES

Sponsored by COMPUTERWORLD
Managed by THE CONFERENCE COMPANY

To: Ed Bride, Vice President, Editorial Services, The Conference Company, a division of Computerworld, Inc.
797 Washington Street,
Newton, Mass. 02160

Please send me a brochure and registration form for the following seminar(s):

Title

City in which you would probably attend.

☐ *Many of our seminars are available for private, in-house use at a greatly reduced per-attendee rate. For full information on bringing any seminar to your facility, check here.*

Name

Title

Company

Address

City State Zip

Phone ( )

NOTE: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800.

System Shortens Registration Process at University

YOUNGSTOWN, Ohio – Students registering at Youngstown State University this fall can get the job done in a matter of minutes instead of standing for hours in the traditional long lines.

The registration system, which employs a combination of data processing equipment commonly found at large campuses, accepts or rejects the course program proposed by the student, files the accepted program information in disk storage and later generates the billing to the student.

"We developed our system so our 14,000 students, many of whom commute from the suburbs and who work, could complete registration in one expeditious visit to the campus," according to David W. Beede, Youngstown's assistant director for computing services.

One-Day Registration

Students who have been cleared for registration beforehand by mail are invited to register on a day scheduled according to how close they are to graduation. Earlier registration is given to upperclassmen so they are better able to get into required courses before they are filled.

At the registration center, the student produces a completed scan sheet which contains, in the form of blackened-in spaces, the code numbers of the courses he wants to take and his student identification number.

An optical scanner reads the form and conveys the information to the school's IBM 370/145, which, referring to the student's file in Memorex 3670 disk drives, makes several critical determinations.

For example: is the student allowed to register at all or is he suspended; do the courses selected conflict with each other in terms of time, and is the course already filled?

Hard-Copy Printout

If none of these or other problems exist, the student receives a hard-copy printout confirming his completed registration, which takes about 20 seconds altogether.

If there are problems, a CRT terminal nearby is available to investigate the errors (indicated on the printout) that have barred the registration from being completed.

The system is a real-time, interactive one, so that if a student is suspended, for example, and clean determines the student should be reinstated, the change to the records can be made in moments using the CRT terminal to update the file.

Youngstown State University has not only automated the registration process, but is using its DP facilities for many other tasks, ranging from scientific research to payroll to making time available to local charities.

To perform these extensive DP services, the overall system includes eight disk spindles, each containing 100M bytes of information.

Use of the independent disk drives, which replaced IBM equipment, gave the college "a third more storage space for the same money," Beede said.

Youngstown State College uses Memorex 3670 disk drives to provide storage for the school's on-line student registration system.

Centralized DP Best? Depends on Company

(Continued from Page 29)

Comparing the situation in 1975 with 1971, total productivity is up 55%. Total costs are level in spite of this increase in throughput and in spite of inflation. Total staff is down by 11%. On a cost basis, consolidation has been beneficial.

The consolidated organization had an overall 1974 budget of $14 million and 655 employees.

No Further Consolidation

As a consequence of consolidation and centralization, Sun Services has now reached a point at which there is no further consolidation of hardware indicated and in which it has sufficient control over the systems analysis and development programs so that it can look toward a shift in approach to other kinds of systems, with the following opportunities.

- Enlarged options for systems designers, including virtual storage, the data base and remote job entry facilities of IMS.
- The data transmission network can be used to communicate both with the central site and with other sites on the network through the central site.
- Multiorganizational systems and multiple use of individual data bases.
- With data terminals connected to the central source, on-line access to the central files.

As for the future, Sun Services expects to see a system of large central computers connected to a distributed network of smaller local computers and input/output terminals which are also interconnected.

Eric A. Weiss is manager of planning and administration at Sun Services Corp. in St. Davids, Pa. This article was presented in a speech at Info 75 in New York City recently.

Device From Recortec Lets User Copy Tapes in Library

SUNNYVALE, Calif. – The Recortec computer tape copier (CTC) is an off-line device designed to allow the user to duplicate tapes within the tape library.

Tape library staff can also use the device to write tape headers, verify archival files, evaluate scratch tapes, verify incoming data tapes and clean and evaluate new tapes, the vendor said.

The CTC costs $2,500 from the firm at 777 Palomar Ave., 94086.

Because all double-density disk packs conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to exceed industry standards. Because there may be times when your disk pack will have to survive excessive head loading, temperature variations, extended use, and other unexpected trials, we make a pack that will go the extra distance for you. Let's look at a few superior points of the BASF 1246 double-density pack.

The binder that won't quit

As you probably know, magnetic coating doesn't stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure that the coating won't peel or flake off.

Our own coating process

At this high level of packing density, it is even more important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the circumference decreases. In addition, unlike conventional disk packs, double-density disks must be magnetically oriented, which calls for even more sophisticated technology. For these reasons, we've discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

A polished performance

Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. Here again, we're dealing with a double-density medium in which the heads fly much closer to the disk surface than in conventional disk packs. With our new polishing process, we've been able to achieve a surface measurably smoother than the industry norm . . . so flat that the possibility of a head crash being caused by uneven disks is completely eliminated. We might mention here that the coating and binder formulation, combined with coating and polishing techniques, all are important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

Achieving balance

Like any rapidly rotating object, a disk pack will behave strangely if not perfectly balanced. In our precision balancing operation, any weighting required is screwed into place, which eliminates the potential for shifting inherent in a conventional adhesive weighting system.

And to make sure . . .

We test our 1246 disk packs to standards much tighter than those of the leading equipment supplier. If anything unpleasant should happen, we'd much prefer it happen here than on your drive. As a regular procedure, we do scratch tests to check coating thickness, impact tests to determine head crash resistance, detergent tests to check resistance to wear and temperature variations, and drop tests to make sure balance and alignment don't shift during shipment. We test to make sure our 1246 disk packs are error-free.

Finally

Our 1246 costs no more than other double-density disk packs. You're already paying for BASF quality . . . you might as well have it. For more information on the 1246 or other BASF disk packs or cartridges, write to BASF Systems, Crosby Drive, Bedford, MA 01730 . . . or call our nearest regional office: in Los Angeles, (213) 386-7023; in Chicago, (312) 343-6618; and in Clifton, NJ, (201) 473-8424.

You're already paying for BASF quality, you might as well have it.

Inforex Tabletop Card Reader Expands 1300 Line Capabilities

BURLINGTON, Mass. – Inforex has added a tabletop card reader to expand the input capabilities of its Series 1300 key-to-disk systems.

The Model 2510 reads 80-column punched cards at a speed of 300 card/min. Its applications include:

- Direct input from card to processing equipment.
- Direct card-to-printer transfer, which facilitates unit record listing, editing and reformatting tasks.
- Direct card-to-disk data transfer, with reformatting of previously edited data.
- Direct card-to-communications transfer, which permits users to move data quickly to an on-line transmission mode.
- Paging and searching for single or multiple records stored in a card-only formst, without the need for conversion to disk or tape medium.

The Model 2510 has a read speed of 300 card/min and a hopper capacity of 500 cards.

The card reader is transparent to Series 1300 operating systems, Inforex said, so users require no modification of existing control software. The Model 2510 is installable and usable within an hour, with just a single card adapter and cable interconnection, the firm stated.

Card Reader Activity

All activities using the card reader are handled by Series 1300 systems software as if they were standard Inforex tape commands. Thus, appropriate status files, job file records and data transfers are automatically created and executed.

The card reader controls include a power switch, a reset switch and a halt switch. In addition, a "card reader busy" status light indicates conditions of hopper empty, stacker full, power off, card jam and reader check.

Purchase price per unit is $4,250, or $136/mo on a three-year lease, not including maintenance. The card reader adapter unit sells for $1,500 or leases for $34/mo over a three-year term.

Deliveries will begin in the fourth quarter of the year.

Inforex is at 21 North Ave., 01803.

Instrument Society Sponsoring Clinic On Camac Standard

PITTSBURGH, Pa. – A clinic on the Camac Standard Modular Instrumentation and Digital Interface System will be held in Milwaukee on Monday, Oct. 6, during the annual Instrument Society of America Industry-Oriented Conference and Exhibit. The clinic will begin at 2:30 p.m. in the Clipper Room of the Milwaukee Downtowner Motor Inn.

Tutorial Overview

Camac is a standard of the International Electrotechnical Commission (IEC publication 516) with no proprietary aspects or licensing requirements. The clinic will include a tutorial overview. Software support as well as hardware standards will be discussed. Operating equipment will be on hand.

For sdditional information contact Instrument Society of Americe, 400 Stenwix St., 15222.

NEW BOOKS IN DATA-PROCESSING

20% discount granted for cash with order!

System Development Methodology

by G.F. HICE, W.S. TURNER III and L.F. CASHWELL

1974 IX + 370 pages US $ 31.25

The System Development Methodology is a comprahensive guideline for the planning and control of data processing systems from their conception to disposal. The book provides an extensive number of checklists for all stages of system development and implementation. Special features include emphasis on the need for user involvement and the designing of systems for people instead of for machines. The succesful application of the SDM by several firms over the past 3 years has led to the publication of this volume, and should therefore be especially useful for management, project managers, users, analysts end programmers.

Data Base Management Systems

edited by D.A. JARDINE

1974 X + 279 pages US $ 26.95

The first SHARE conferance devoted to the architecture and implications of large-scale data management systems was held in Montreal. Users, implementors and workers in this important area of computing, gathered together to discuss their mutual problems. Sixteen invited papers, two panel discussions and a section on responses from hardware and software vendors comprise these proceedings. The book first examines user-experience with IBM's IMS's, UNIVAC's DMS 1100, CINCOM's TOTAL, HONEYWELL's IDS and XDS DMS end formulates user-requirements for future date base management systems. Data independence and implications of this on date structuras, programming languages and system performence are some of the technical aspects which are enelysed. Problems relating to the management of dete base systems and the impact of such systems upon the enterprise are also brought into focus.

Data Base Management

Proceedings of the IFIP Working Conference on Data Base Management, Cergese, Corsica, France, 1-5 April, 1974.

edited by J.W. KLIMBIE and K.L. KOFFEMAN

1974 X + 423 pages US $ 29.95

Papers presented at the meeting and summaries of the discussions are contained in tha book. Particularly outstanding features are: a discussion on the equivelence of the DBTG and relational approach; several different views of the data modelling problem; several theoretical treatments of implementation problems (data equivalence, access path selection, data base editions, concurrency, integrity, atc.) some articles on existing DBTG implementations.
A state of the art report, this book will be of incalculable value to researchers in the date base management area and to those people implementating data bases in real life situations (e.g. data administretors).

Human Choice and Computers

Proceedings of the IFIP Conference on Human Choice and Computers, Vienna, April 1-5, 1974

edited by E. MUMFORD and H. SACKMAN

1975 about 350 pages US $ 35.50

The increasing use of computers in every sphere of human activity calls for a greater awareness of the role of computers in society.
At the IFIP Conference, computer technologists, trade unionists and social scientists discussed a variety of human problems: how to use computers and design systems for the collection and application of information which will give more, rather than less satisfaction to employees; how to improve democratic processes in management end prevent the concentration of excessive power in the hands of managers by developing information systems that are not solely management-orientated; the dissemination of information by governments and questions of privacy.

Data Base Description
An In-Depth Technical Evaluation of Codasyl DDL

Proceedings of the IFIP TC-2 Special Working Conference, Wepion, Belgium, 13-17 January, 1975

edited by B.C.M. DOUQUE and G.M. NIJSSEN

1975 VIII + 382 pages US $ 31.75

The DDL (Date Description Language), considered by many as the basis for standard deta description in industry, was the main theme of discussion at the conference attended by some 60 invited participants from 12 different countries.
Implementors, users and language designers including members of CODASYL committees jointly analyzed the DDL in order to preserve its strong points, and if necessary, propose improvements for week points. Several papers describe improvements for the DDL with summaries of discussions given after the relevant papers. Panel discussions are summerised at the end of the proceedings, the major result of these being the presentation of 10 recommendations to the CODASYL DDL Committee.

Economics of informatics

edited by A.B. FRIELINK

1975 480 pages US $ 41.75

Three major themes are dealt with in these symposium proceedings:
1. The methodology of the efficiency of informetic systems.
2. The methodology of effectivenass of information systems.
3. The development of National Policies end Plans for informatics.

These aspects are presented et the macro-level, by discussion of National Policies and Plans, and at the micro-level where the concepts of efficiency and effectiveness of informatics are dealt with.
The 45 papers contributed by experts in various economic fields emphasize the methodology of assessing the value of computer use and that of promoting, or at least monitoring, the rational application of computers.

Command Languages

Proceedings of the IFIP Working Conference on Command Languages, Lund, Sweden, July 29 - August 2, 1974.

edited by C. UNGER

1975 VII + 402 pages. US $ 29.95

This IFIP working conference brought together users end designers of operating systems with the purpose of establishing a common base lor further research into command languages and their design considerations. Twenty five papers delivered at the conference cover: functions and facilities enalysis, the relationship of command languages; formal descriptions of operating systems from the users' point of view; portability and machine independence; and network command languages.

20% discount order form 2/75

North-Holland Publishing Co.
attn. Don Hall
52 Vanderbilt Ave., New York, N.Y. 10017

Please send me the books checked below at the discount prices mentioned:

- ☐ System Development Methodology, U.S. $ 25.40
- ☐ Command Languages, U.S. $ 24.00
- ☐ Human Choice and Computers, U.S. $ 28.40
- ☐ Data Base Management, U.S. $ 24.00
- ☐ Economics of Informatics, U.S. $ 33.40
- ☐ Data Base Management Systems, U.S. $ 21.60
- ☐ Data Base Description, U.S. $ 28.40

☐ check enclosed: .....

Name: .....

Address: .....

.....

(In order to qualify for this discount please send this coupon or a photocopy of it together with your payment).

Did you fall down when IBM recently announced their new 3350 disk units?

Pick yourself up and fill out this coupon.

CalComp just announced the new 1035 family of disk storage systems.

We store more... up to 400 megabytes per disk. And we cost less to lease and less to buy.

CalComp offers 100, 200, and 400 megabyte disk drives at lower cost than IBM.
To find out how much, please fill in the following information:

California Computer Products, Inc.
2411 W. La Palma Avenue, Anaheim, California 92801, (714) 821-2011 CW-M9-75

Name _____ Title _____
Please print or type

Company _____

Address _____

City _____ State _____ Zip _____

My company has a 370/_____.

My company has ____ disk drives installed.

My company plans to add ____ additional disk memories this year.

I am interested in how many dollars we can save by switching to a CalComp disk drive now.

Please have a salesman call.

CALCOMP

Mini, Terminals, Software Wed In Raytheon Satellite System

NORWOOD, Mass. – A computing system from Raytheon Data Systems can be adapted with a few keystrokes to perform six of the most common processing tasks in remote offices and departments served by a distributed information network, the firm said.

Raytheon said its PTS-1200 system combines conventional minicomputer, terminal and peripheral hardware with a software system that allows local offices of large organizations to perform:

- Source data entry and preprocessing, including editing and validating of most data.
- File and record maintenance, including creating, accessing, manipulating and updating locally stored data.
- Unattended two-way communications, either in point-to-point or multipoint networks.
- Stand-alone batch processing at a level comparable to that offered by small business computers.
- Report printing to enable branch offices to quickly produce a variety of reports.
- Terminal emulation that is "transparent" to the user.

The basic PTS-1200 hardware consists of a minicomputer with a one µsec cycle time, programmable main memory expandable up to 128K bytes, up to eight disk storage devices with a total capacity of 20M bytes of information, up to 24 CRT terminals and optional peripheral equipment that includes serial and line printers and a card reader.

Because of its applications development facilities, the software system makes flexible branch office computing economical and practical, the firm said.

The "foundation package" can be considered the baseline programming capability. It consists of a series of standard routines with which users can perform basic data entry, file generation and format creation with simple keyboard commands.

Each PTS-1200 system has its foundation package built in. Operators and programmers can actually be building files before the application programs are written, the firm said.

The ease and speed of initial start-up provided by the foundation package is amplified by the macro statements of the Macrol language, Raytheon said.

A list of 110 statements, easier to use than most high-level languages and developed specifically for this display-oriented system, enables applications programmers to develop jobs quickly, the firm added.

The macros are supported by a library of programming and debugging aids that enable some programs to be written, tested and be put into operation faster and more concisely than equivalent Cobol programs, Raytheon claimed. In addition, a library of utilities is included with the Macrol language.

Disk Operating System

The third major feature, the disk operating system, handles multitasking and multiprogramming. Programs are called from the disk by name and are immediately available to accept operator input, the firm said.

All of the systems and applications programs are disk-resident, requiring no card, cassette or tape loading. Nor does the system depend, in any way, on a mainframe for the compiling and validating of programs. The software is completely stand-alone, the firm said.

Among the direct benefits of the PTS-1200 system, Raytheon said, are reduced communications costs for transmission between the system and a host computer, reduced CPU usage and size, reduced forms costs and availability of information on a real-time basis because of the single common data base.

Communications are handled through binary synchronous on Ebcdic formats at up to 9,600 bit/sec.

Eight-Station System

A typical eight-station system with 960-character displays, a 64K-byte processor, one 165 char./sec serial printer and 5M bytes of disk storage, can be leased for $1,997/mo on a one-year contract or $1,598/mo on a three-year contract or may be purchased for $55,550. Maintenance and software are included in the lease prices. The firm is on Route 1, 02062.

This PDP-11V03 system includes dual floppy disks and choice of VT52 CRT or LA36 printer.

DEC OEM Group Releases Printer, Micro System

MARLBOROUGH, Mass. – Digital Equipment Corp. has unveiled a 180 char./sec matrix printer and a microcomputer with an interactive, terminal-based, real-time operating system.

The LA180 Decprinter I has a full 96 character Ascii set with upper- and lower-case symbols and a 132-column print capability. The printer can handle forms of varying widths (from 3 in. to 14-7/8 in.) and has a paper-out-switch, top-of-form, self-test and backspacing capabilities.

The LA180 employs parallel interfacing and can be located up to 100 feet away from a central processing unit, the firm said.

Priced at $1,975 in units of 100, the LA180 can handle multiple forms of up to six parts. A rotary switch top-of-forms control permits the user to select any of 11 common forms lengths, the firm said.

Volume deliveries of the LA180 Decprinter I are scheduled to begin early next year.

Employs Tractors

The paper-feed system employs tractors with four-pin engagement. A fine vernier knob is provided for paper positioning. A servo system is used to transport the head along the machine's horizontal axis; carriage return has a duration of approximately 300 msec.

The PDP-11V03, a low-end real-time system, is built around DEC's recently introduced LSI microcomputer which uses the 400+ instruction set of the PDP-11/40. The standard PDP-11V03 employs dual floppy disk drives as a mass storage device, offers user's a choice of either an LA36 keyboard terminal printer or a VT52 Decscope video terminal as an input/output communication device and comes with an RT11 real-time operating system.

Users can add Fortran IV or Basic for higher level language capabilities, the firm said.

RT-11 Operating System

Operating software for the 11V03 is provided through the RT-11 operating system. RT-11 is a disk-based system that can be used to develop and operate user programs written in Fortran IV, Basic or machine language. RT-11 also includes program modules for software debugging, editing, file maintenance, library access and utility program operations, the firm said.

The system's mass storage unit is a dual floppy-disk drive, the RXV11, and has a total storage capacity exceeding .5M bytes. Its average access time is 483 µsec. Data is transferred between the disk and the microcomputer over bidirectional lines at a rate of 10,000 bit/sec.

Complete system selling price is $9,950 and will be deliverable beginning in January.

"The physical size and low cost of these microcomputers belies their actual computational power," a DEC spokesman said.

"With this system, for instance, a user of remote terminals can open, modify or close files stored on the disk system through communication with the host processor. At the host processor, both nonreal-time functions – operation of the line printer and terminal operations, for instance – are performed in the background of the RT-11 foreground/background monitor, while real-time tasks such as communication with the remote system and remote data acquisition are performed," he added.

Standards Anyone?

WASHINGTON, D.C. – The Minicomputer Interface Standards Task Group of the American National Standards Institute (Ansi) Committee X3T9 is completing the definition of the requirements for standard interfaces between minicomputers, device controllers and peripheral devices.

Specifications of existing interfaces are being collected and analyzed to determine their similarities and differences as a first step to the development of standards in this area.

The next meeting of this group will be in Denver at the end of September. Further information is available from: Thomas J. Alshuk, The Fenn Manufacturing Co., Fenn Road, Newington, Conn. 06111.

Thinking Small Saves Chicago in Program Cost

CHICAGO – When it comes to financial applications, dealing with the city of Chicago's well-established, giant computer network can sometimes be too much of a good thing, as the Metropolitan Sanitary District (MSD) of greater Chicago found out recently.

"In fact, even though the city's existing computer system had more than enough capacity to service us, it would have cost us at least 50% more to convert the city's financial programs and link up to their network than it would to buy a stand-alone minicomputer," DP Manager Walter F. Sobek said.

Key to the decision in favor of a separate, but expandable, business-oriented minicomputer system was A.G. Sciacqua's insistence on developing an online, interactive system to handle financial data such as the encumbrance and disbursement of all budgeted funds, user inquiries, payment of vendors and summary reports. Sciacqua is clerk of the district and also the head of the Finance Department.

Nine publicly elected trustees overseeing the district's anticipated budget of about $2 billion over the next 10 years opted for a Basic/Four Corp. minicomputer "primarily because it was the least expensive and most applicable system to handle our problem," the DP manager said.

Obvious Solution

"After the manufacturer of the accounting machines we had been using for decades for accounting and payroll runs parts would no longer be available, the obvious solution appeared to be a terminal linkup into the city's existing, massive financial computer system. But a consultant's estimate to redesign its very large computer network to handle our specific accounting needs came to almost $100,000 and we would have to provide our own programming in addition," Sobek said.

Interestingly, replacement of current bookkeeping machines could have been achieved with modern accounting machines hard-wired to perform the posting functions carried out by the government agency.

"Advances in accounting equipment were evident, but these devices simply did not fulfill the basic requirements of an on-line input and inquiry system, since they are still primarily key-driven, electromechanical devices," Sobek said.

"We then looked to several minicomputer manufacturers which would be willing to perform the turnkey job of providing hardware and software to our specifications for on-line appropriation accounting."

As Advertised

Representatives of the Metropolitan Sanitary District fixed on Basic/Four as a leading possible supplier and visited several area installations without a representative from the minicomputer business system manufacturer present.

"We found the systems used elsewhere were performing 'as advertised.' This step of visiting other users before purchasing is a must in my estimation, along with a Dun & Bradstreet report on the manu-

(Continued on Page 38)

The Hewlett-Packard 3000 is a minicomputer?

"The 3000 a minicomputer? I think calling the 3000 a mini is an abomination!"

When we asked Mr. Thomas Harbron, Director of the Computing Center, Anderson College, Anderson, Indiana, what he thought about the HP 3000, he had some very interesting things to say:

"We're using the 3000 for administrative processing, academic work and some commercial work. We have 27 terminals and we selected the 3000 because we wanted a system that would provide us with remote access and would do general purpose types of things from the terminals. The 3000 allows us to do many different things at different terminals. In fact, it does everything we expected it to do and was the only machine we could find in its price class that would. I'd recommend the 3000 to others. It's a powerful and versatile machine. And it's cost effective as well. It's half the price of anything that comes close to it."

"I don't think that Hewlett-Packard ought to call the 3000 a minicomputer. It is a complete medium-sized system."

That's what the EDP center manager of an aircraft manufacturer said about the 3000. He also had this to say:

"One primary reason we bought the 3000 was to collect and analyze radar development data. The problem is that we have to collect data fast enough, pipe it to a computer, analyze it, and then make the necessary instrument adjustments. HP's 3000CX was the answer. We also bought it for its interactive capability. Very significantly, in our acoustics department we had to have the ability to turn around data analysis fast. The 3000 has been a real cost saving computer for us. For the last two years I was the entire staff for the 3000. Not a great deal of detailed knowledge of the system is necessary. Technicians can use it without much training. I'm very much sold on the 3000. And it's definitely a complete system—not a minicomputer."

"It allowed us to run eight times the volume at a third the cost. No minicomputer could do that!"

The above statement was made by the corporate banking division EDP manager of a major California bank. He also said:

"We've had the 3000 for over nine months. A year ago we were on a time-sharing system and the cost became prohibitive. We contacted six different companies to look over and bid on a proposal that defined our needs. HP was the only one that could handle our total application of management information for the Corporate Banking Division. The 3000 is not just a mini—it's much more. We're constantly amazing people here with what we can do. It's not hard to operate, not hard to cope with. But our favorite topic is that we're paying less than one third of what we were paying and running four times the volume. And this year, we'll double our volume again. That's eight times greater and less than one third the cost.

That's really productivity!"

"We found the only thing mini about the 3000 was its price."

When we asked the EDP center manager of another major manufacturing company about the 3000, that was what he had to say. He also had this to say:

"Our computer needs include both scientific and commercial applications. We were phasing out our teleprocessing terminal and our Environmental Monitoring Division's computer. So we started looking. We spent several months studying computer systems, and rated them on speed, versatility and ease of operation. The result of our study showed that the HP 3000 provided these requirements and had the best cost/performance ratio. We didn't fully realize the potential of the 3000 until we started programming it. We have experienced a significant cost savings in the seven months we've had the 3000 and we expect a greater savings in the months ahead. We really like the interactive CRT for programming and data input. Being a multi-programming system we can have many users on at the same time. The power and speed of the 3000 is equal to a large machine. It's no mini. Calling it the Mini DataCenter is more accurate. I'd definitely recommend the 3000 to other potential users. In fact, we already have. We feel they would be money ahead."

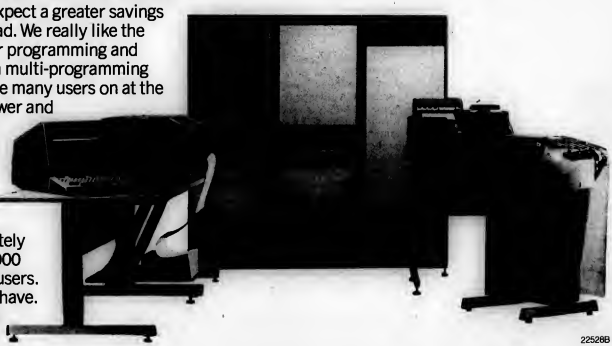
We're glad these and other users of the HP 3000CX set us straight. We called it a minicomputer because its state-of-the-art technology lets us sell it for a minicomputer price. From now on we'll call it a Mini DataCenter.

We want you to get the whole story. Write us for your copy of our HP 3000CX Mini DataCenter booklet. We know you'll find it interesting, informative, and maybe a bit surprising.

HP Mini DataCenters. They work for a living.

HEWLETT hp PACKARD

Sales and service from 172 offices in 65 countries.
1501 Page Mill Road, Palo Alto, California 94304



22528B

Hardware Savings Lost in Software Development

By Edith Holmes
Of the CW Staff

NEW YORK – A user may conserve hardware funds by buying a minicomputer, then lose all his savings in software development, Eric Frey, president of Frey Associates of Windham, N.H., told an Info 75 audience here recently.

For this reason, the definition of software costs becomes all important in the buyer's decision to go with a mini, he told an introductory session on minicomputers in business.

"Software costs go up exponentially when compared with the order of complexity of the application," Frey noted, adding that minis generally are best suited to a dedicated application or groups of applications.

"A mini manufacturer won't be able to provide the extensive software development – say on the order of $2 million – that IBM will put into a large-scale machine," Frey stated. Yet the software costs and the development and implementation demands of a mini-based system are the same as those of a large mainframe.

In some areas, he suggested, a mini may even require more in the way of planning. An on-line, distributed mini system, for example, necessitates a certain amount of education. "Such processing is very different from the centralized batch operation that the staff of a large device is likely to be used to," Frey said.

Finding Software

Users in search of software for their minicomputers and not interested in writing it themselves can go to turnkey systems houses or to software houses or to consultants. In the case of the turnkey vendor, only licensing rights will be purchased: "you will not own such software," Frey said.

"Software houses and consultants will follow usual business practices and, if you ask to own the programs, that can be written into the contract."

"At present, there are no significant large-sized software houses selling packaged mini software, except for the few that design operating systems for minicomputers," he added.

When looking for hardware, "knowing what you want in the way of applications allows you to make up a list of target vendors," Frey noted. "And, in my opinion, the big mini makers have more to offer in this realm than the large mainframe manufacturers.

"Once IBM and the seven dwarfs seemed to be taking an active interest in this market. The first minis to dominate the field were the Honeywell 316 and 516 machines," he commented. "But, by 1966, Honeywell was second to Digital Equipment Corp., and now its sales rank about 13th."

The big three in minis now are DEC; Data General Corp. and Hewlett-Packard, he said, adding that no mini manufacturer has yet developed a wide range of business applications and machines.

"Datapoint, not one of the companies you first think of when minis are mentioned, is the only one that has a pretty good business machine hardware and software-wise." He indicated DEC had the hardware potential, but little commercial software suitable to business applications.

When considering turnkey systems, Frey urged his audience to look at price and performance and to make certain the vendor takes an interest in learning about the business environment in which the system will be working.

Finally, Frey cautioned would-be mini owners to evaluate the vendor for maintenance capability and potential for application and system growth.

Thinking Small Saves Chicago 50% of Cost Of Financial Program

(Continued from Page 35)

facturer's finances," Sobek said.

Satisfied from this standpoint, a programmer analyst was designated to create specifications for the system, in conjunction with personnel from the Treasurer's Office, the Accounting Division and the Management Control Office.

"The minicomputer systems vendor was obligated to MSD to deliver the hardware and programming for the agreed-upon price," Sobek emphasized.

The software was contracted to an outside vendor. While system testing was in progress, the Chicago MSD sent two programmers to a Basic/Four four-day training course.

The ability to increase usage of the on-line minicomputer system proved of major importance to the district, a move which MSD estimated would have been much more complex with either a tie into a larger computer or the use of accounting machines. In fact, MSD has programmed two entirely new applications since acceptance of the system and added another CRT terminal, an additional disk drive and additional memory.

"System maintenance is contracted to a division of the minicomputer's parent company at approximately $300/mo and downtime is practically nonexistent," Sobek said.

The system is composed of a CPU, two disk drives, three CRT terminals, a printer and a magnetic tape drive. The magnetic tape is the data exchange media to the MSD's in-house IBM 360/40 computer.

Device Added by Datapoint Prints at 600 Line/Min

SAN ANTONIO, Texas – A 600 line/min printer is available for Datapoint intelligent terminals and small business computers.

The printer uses a 64-character font on a 132-column format on up to six-part, carbon-interleaved, multipart forms.

The Model 9260 uses the drum method of printing and features a swing-away gate for paper loading. A clutchless paper feed and voice-coil print hammer positioning make the printer highly reliable, Datapoint said. Liberal use of acoustic material keeps noise to a minimum, the firm said.

The 9260 leases for $612 on a two-year basis including maintenance within a standard maintenance area.

The firm is at 9725 Datapoint Drive, 78284.

Applicon Combines Line, Photo Plotting On One Machine

BURLINGTON, Mass. – A flatbed plotter from Applicon, Inc. offers both line and photo plotting capabilities in a single unit.

Known as the AP53 graphic plotter, the machine has interchangeable heads and removable panels that adapt the equipment for either line or photo plotting in less than three minutes, the firm said.

Average speed during printing is 10 in./sec. At all other times – when the head moves to a new position, for example, or when the unit is used for line plotting – speed ranges up to 40 in./sec.

The machine is capable of outputting 33-in. by 45-in. drawings on either conventional or photosensitive media.

A magnetically controlled frictionless motor drive eliminates gears, servos, cables, ball and lead screws and the tolerance loss associated with conventional plotters. The equipment operates with positioning accuracy of 1 mil/ft/axis while maintaining 5 mil accuracy over the total active plotting area, the firm said.

Applicon AP53 Graphic Plotter

The plotter is priced at $70,000 when furnished with the Applicon Graphic System. It may also be used off-line with the addition of a separate controller.

Applicon is at 154 Middlesex Tnpk., 01803.

Mini Cuts System Costs 50% As Engineers' Workload Doubles

CORAPOLIS, Pa. – A compact computer has cut computer costs in half, while the workload has doubled for The Chester Engineers, Inc., an environmental engineering and planning company headquartered here.

The system is used not only for on-line problem solving in a number of disciplines such as chemical, electrical and structural engineering but also for automated preparation of specifications, operating manuals and other published materials.

The Chester Engineers offers technical services pertaining to sanitary engineering, air-quality control, solid-waste management and the management of industrial and municipal wastewater.

Before leasing a Hewlett-Packard (HP) 3000, The Chester Engineers subscribed to a time-sharing service. The HP 3000 has cut The Chester Engineers' monthly computing costs by about 50%, while DP volume has approximately doubled, according to Paula Wilson, the systems analyst who supervises computer services for the company.

Wilson said two projects have depended heavily on the HP system:

- The company has developed computer programs for analyzing rainfall and water-flow data from separate and combined sewer systems. The data are collected by automatic strip-chart recorders at treatment plants and at overflow points (where untreated wastes are discharged to receiving waters).

This information is digitized, converted to flow volumes (by reference to rating curves) and used in generating hydrographic plots that relate hydrological conditions within the sewer system to rainfall and soil moisture. These programs, in conjunction with other statistical software, provide rapid analysis of large volumes of hydrological data for the designing of overflow facilities.

- Now under development is a computer mapping system for analyzing both the magnitude and distribution of numerous environmental factors that are related to the discharge of pollutants.

These include soil types, geology, land-use patterns and population densities. The system would accept both alpha-numeric and cartographic inputs, and it would be able to take data from maps drawn to different scales, styles and cartographic conventions.

As output, the mapping system would be able to present plots showing, for example, all the areas within a study region having a given population density. Such plots would be used in urban planning and in studies dealing with land-use policies.

The Chester Engineers' computing system includes a tape drive, two 5M-byte disk drives, a line printer, a Calcomp plotter, three CRT terminals, two hard-copy terminals and a Scriptographic tablet for entering graphical data onto graphical displays.

In choosing a computer for the system, the company considered computers from 15 different suppliers, Wilson said.

Only two of them could provide true time-sharing and multiple-languages; all of the others were limited to Basic.

35 Makers Exhibiting At California Show

LOS ALTOS, Calif. – The California Computer Show will be held tomorrow, Sept. 25, in Los Angeles at the International Hotel. Show hours will be from 1 p.m. to 7 p.m.

The California Computer Show is an invitational show that will feature 35 selected manufacturers of computer products and provides OEMs and end users the opportunity to discuss their requirements with factory personnel.

The show management can be reached at 95 Main St., 94022.

Arithmetic Processor Works With Harris Corp. Slash 5

COCONUT CREEK, Fla. – Data Engineering, Inc. has a Scientific Arithmetic Processor (SAP) for the Harris Corp. Slash 5 central processor.

The unit upgrades the Slash 5 to exceed 80% of the Slash 4 performance with SAU.

The SAP is priced at $9,500. The unit is also available for the Slash 3 central processor for $12,500.

The firm is at 4070 N.W. 5th St., 33066.

THE INFORMATION SYSTEMS HANDBOOK

THE EXECUTIVE'S GUIDE TO PLANNING AND UTILIZING THE SYSTEM MOST EFFECTIVE FOR THE COMPANY'S NEEDS

About the Editors

F. WARREN McFARLAN is Professor of Business Administration, Harvard University. His main areas of interest are in management information systems and information systems administration. He is the co-author of four previously-published books in the field of information systems.

RICHARD L. NOLAN is Associate Professor of Business Administration, Harvard University. He is the editor and co-author respectively of two previously-published books in data resources and information systems administration. His articles in the field of computers have appeared in many professional journals.

The Editorial Advisory Board

William J. Ganeee
Capitol Marketing Corp.

J. H. Geldis
Executive Vice President
Boeing Computer Services, Inc.

Robert V. Head
Special Assistant for
Management Information Systems
U.S. Department of Agriculture

Wheeler Smith
Director of Systems
Connecticut General Life
Insurance Company

Dan Tiekner
New York Data Center Manager
IBM, Inc.

Frederic S. Withington
Senior Staff Member
Arthur D. Little, Inc.

Put the vast knowledge of these leading systems authorities to work for you!

John R. Bennett
Transamerica Information
Services Corp.

Robert P. Bigelow
Attorney at Law
Boston, Mass.

Robert M. Bozeman
Corporate Vice President
Allied Stores

David E. Brown
Xerox Corporation

Gerald J. Burnett
Teknetron, Inc.

Harry A. Chadwick
Senior Underwriting Officer
Chubb & Son, Inc.

Burton J. Cohen
Touche Ross & Co.

William Corum
Manager, Technical
Services—Planning
McDonnell Douglas
Automation Co.

Charles Cushing
Eastman Kodak Company

Robert C. Daley
Director, MIT Programming
Development Office

Raymond Ferrara
President
Systems Consultants, Inc.

Rudolph A. Frisch
Lever Brothers Company

James Gill
Equitable Life Assurance
Society

Robert C. Goldstein
University of British Columbia

Harvey Golub
Shulman Air Freight

Richard A. Gritten
Boeing Computer Services, Inc.

John R. Gustafson
Vice President and Auditor
John Hancock Life
Insurance Co.

Richard D. Harris
Manager, Corporate Systems
Plans and Analysis
Xerox Corporation

John T. Hartman
Manager, NCR Houston
Data Processing Center
The NCR Corp.

K. Eric Knutsen
Eric Knutsen Associates

Walter A. Levy
Coopers & Lybrand

Jerome Lukas
Honeywell Information Systems

Robert J. A. Lord
School of Business
Administration
University of Western Ontario

James C. Millar
Comptroller
Commonwealth Land Title
Insurance Co.

Harlan D. Mills
IBM, Inc.

Dennis E. Muhvihill
Touche Ross Co.

John J. Neughton
IBM, Inc.

David Norton
D. P. Management Corp.

Robert P. Popadic
Vice President and Gen. Mgr.
State Street Boston
Leasing Co., Inc.

Paul P. Raichertz
Computer Systems and
Management Sciences Dept.
Mobil Oil Corporation

Michael J. Semek
Celanese Corporation

George Schussel
Vice President
American Mutual Liability
Insurance Co.

Richard D. Secrest
Data Base Administretor
Standard Oil Company of
Indiana

N. Louis Senensieb
Vice President
Gottfried Consultants, Inc.

Henry H. Seward
D. P. Management Corp.

Richard E. Thompson
Assistant Director, Data
Processing Management
Krafteo Corporation

Eric M. Timmreck
Supervisor, Process
Control Software
Shell Development Company

Joe B. Wyatt
Office of Information
Technology
Harvard University

Norman Zachary
Data Architects, Inc.

The Information Systems Handbook is your guide to planning, selecting and utilizing the information system most effective for your company. An effective system can save your company thousands of dollars. A poorly planned and poorly managed information system can cost *your company hundreds of thousands of dollars!*

The past two decades have seen a remarkable growth in the importance of data processing systems in the management of corporations. The increase in the complexity of equipment and programs together with the concommitant increase in the complexity of the organizations they serve confronts executives with a bewildering array of information systems from which to choose. This handbook will help you make the selection that will provide optimum service at the minimum investment of time and resources.

Each chapter was written by an authority in the field and, to further increase the authoritativeness of the entire work, each chapter was also reviewed by both businessman and academicians. The forty chapters have been grouped into six sections which cluster related groups of issues and mirror the organization of the data processing department. The first two sections deal with the broad responsibilities of the data processing executive as a member of the top management team and as an administrator of a major function. The third section deals specifically with the problem of manpower administration and development. The fourth section focuses on the methods and tools for evaluating the technical alternatives facing the organization. The fifth and sixth sections deal respectively with the issues relating to the development of new applications and managing the computer operations activity.

40 chapters explain in detail how to plan and utilize an information system with maximum efficiency

I. THE INFORMATION SYSTEMS MANAGER AS A MEMBER OF THE TOP MANAGEMENT TEAM
1. An Overview
2. Strategy Formulation and Information Systems: Setting Objectives
3. Corporate Organization and Information Systems

II. THE INFORMATION SYSTEMS MANAGER AS THE ADMINISTRATOR OF A MAJOR CORPORATE FUNCTION
4. Organizing Information Systems Resources: Centralization versus Decentralization
5. Problems in Planning the Information System
6. Corporate Systems and Procedures Responsibility
7. Evaluating Information Systems
8. Design of Chargeout Control Systems for Computer Services
9. Trends in Audit and IRS Practices and Their Implications for the Information Systems Manager
10. EDP Internal Auditing
11. Legal Aspects of Information Systems Management
12. Insurance and Information Systems Management

III. INFORMATION SYSTEMS MANPOWER
13. Managing Systems Analysts
14. Managing Programmers
15. Operations Management
16. Training and Recruiting Programs

IV. FINANCIAL AND ECONOMIC ANALYSIS OF ACQUISITION
17. Feasibility and Replacement Study
18. Performance Measurament: Vendor Specifications and Benchmarks
19. Computer Systems: Simulation
20. Computer Options: In-House Capebility, Computer Utilities, Time-Sharing Facilities Managament
21. Computer Options: Large Centralized Computers versus Minicomputers
22. Evaluation Purchase/Lease/Rent Alternatives

V. APPLICATIONS DEVELOPMENT MANAGEMENT
23. Computer Based System Life Cycle
24. Project Management
25. Business Systems Analysis: Problem Definition
26. Business Systems Analysis: Program Design
27. Programming Standards and Control
28. Management Science Model Development
29. Managing the Operating System Environment
30. Reel-Time System Design
31. The Data Administrator
32. Data Bases
33. Organization and Control of the Dete Acquisition Function

VI. COMPUTER ROOM ADMINISTRATION
34. EDP Data Acquisition Management
35. Implementing the Dete Communication System
36. Conversion
37. Data Center Moves
38. Scheduling and Cost Control of the Dete Center
39. Computer Security
40. Individual Privecy and the Corporate Computer

10-DAY FREE EXAMINATION

We are confident that you will find this great reference work everything that we have said it is—and much more! To back this up, we will rush this unique and valuable volume to you for a free examination.

If you are not completely satisfied, you may return it within 10 days of receipt, for credit or refund. Just mail the handy coupon!

AVAILABLE AT YOUR BOOKSELLER—OR MAIL COUPON BELOW

Dow Jones-Irwin

1818 RIDGE ROAD • HOMEWOOD, ILLINOIS 60430

Please send me . . . . copies of THE INFORMATION SYSTEMS HANDBOOK $30.00

I understand that if I am not completely satisfied, I may return the book(s) within 10 days of receipt, for credit or refund.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

☐ Bill me

☐ Bill company

☐ Payment enclosed (Dow Jones-Irwin pays postage). Illinois residents add 5% sales tax.

CW

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

Use the attached order form and this envelope for:

- **A new subscription**
- **New address**
- **New Title**
- **New Industry**

Order form is attached through binding. Be sure to include name, title and
or label information when making a change.

First Class
Permit No. 40760
Newton
Mass.

BUSINESS REPLY MAIL

No postage stamp necessary if mailed in the United States

797 Washington Street
Newton, Mass. 02160

COMPUTER INDUSTRY

DBMS Proving Popular

Recession Sparking Sale of Software, Vendors Agree

By Molly Upton
Of the CW Staff

NEW YORK – Software vendors, especially those selling data base management systems (DBMS), generally agree business has improved markedly over last year – and many credit the recession in part for the upswing.

"With the recession, people are looking to conserve money and they see tried-and-true packages as the way to go," according to Don Keith, project manager of financial applications for General Computer Services, Inc. of Huntsville, Ala.

"Business is up more than 100% over 1974" at General Computer Services, Keith said at Info '75 here recently.

General Computer Services started with banking applications and two years ago began selling to the commercial area.

Now the firm plans to enhance its utility routines developed for the payroll package and market them as well as a new product for personnel, he said.

Forrest F. Preece, marketing communications manager of MRI Systems Corp., said economic conditions have helped MRI's data base management business.

The number of inquiries the firm receives is up 50% over last year and MRI "is far ahead of business goals for the year," he said.

MRI plans to stay basically in the data base management field and is looking for "some innovations" in that area. It markets the System 2000 and TP 2000, a teleprocessing monitor.

Best Year Ever

Cincom Systems, Inc. is having its best year ever, according to Mark Friedman and Frank Marsella, marketing representatives.

Cincom's growth rate is between 150% and 160% over last year at this time, Friedman said.

He said much of the increase is because the public is becoming much more educated about DBMS and the firm has broadened the number of vendors' mainframes on which its DBMS, Total, runs.

Total now is available on Control Data Corp., NCR, Univac and Spectra machines and was announced for Varian gear. The firm is also developing a version for Burroughs machines, Marsella said.

The goal by 1977 is to have Total on the systems of all major hardware vendors, Friedman said. It is also planning a utility for Total as well as a data dictionary, Marsella added.

Its current new product, Entry Environ I, is for new telecommunications users.

Cincom has doubled the number of employees since 1974 and now has 300, with offices in Australia and Brazil and a representative in Japan, Friedman said.

Unlimited Demand

Cullinane's marketing manager, John Cooper, said the firm is doing 50% to 75% more business this year than last.

"I'd like to think the reason is we're working harder," he said, explaining he views the software market as unlimited demand with success determined by the people and time spent in generating interest.

Although he doesn't think Cullinane's customers have been affected by the recession, he said any pressure to scrutinize DP expenditures has been to Cullinane's advantage: "They don't go to IBM automatically."

Pansophic Systems, Inc. should do 150% more business than last year and is ahead in the first four months of its new fiscal year, which started in May, compared with last year, according to Lee Mulder, communications director.

Although the summer was slow, May and June more than compensated for the slowdown, he added. It looks as though Pansophic's new European subsidiary will place more installations in September than the parent firm here, he said.

Recently the firm released new versions of all its products, which are supplied without charge to the 92% of its customers who have maintenance agreements, he said.

Pansophic plans to stay in its current market area of IBM 360/25s and up and 370s and not expand into the mini market for the time being, he said.

Studies showed it is too expensive to adapt Easytrieve and Panvalet to minis because it is almost impossible to make a profit and sell at a minicomputer price, he said.

Pansophic's marketing thrust is to get corporate management involved in the DP center by showing how its Easytrieve would help them obtain reports.

The firm plans to be 100% of quota as of October and then through the end of the year, he said.

"We boom in recessions," Mulder observed, adding the two other growth spurts were in recession times.

Business Unchanged

Program Products, Inc. salesman Ron Singer said business is "very similar to last year."

This is a good sign, he added, because the firm's products are in the personnel retrieval area.

(Continued on Page 42)

Micros' Success Dependent on Software

By Molly Upton
Of the CW Staff

SAN FRANCISCO – The success of microcomputers in the marketplace will depend on getting software development tools that effectively shorten design cycles and reduce development costs, Gerry Madea of National Semiconductor Corp. told a session at the Western Electronic Show and Convention (Wescon) here last week.

Software technology appears to lag behind hardware technology, he told the session on microprocessor/microcomputer hardware and support systems.

"The test of the microcomputer manufacturers and customers alike will be how well each appreciates the 'software problem' and understands what tools are required to enable design engineers to effectively use this new generation of computer power," he said.

Solutions outlined during the session included improved translators, a block diagram language, distributed processing techniques and the integration of software and hardware development through in-circuit emulation.

Madea said "language design appears to be the first place to look for software improvements or breakthroughs."

Research must be done to discover languages "that parallel productive, creative thought processes in algorithm design," he said.

Coupling a language that provides "top-down" design flowing into code implementation with concepts of "stepwise refinement" and "modular decomposition," all early activities in the software development cycle, possibly could be automated, Madea said.

"Maybe future languages will supply the software designer with facilities to easily invent his own data structures and operations allowed on those data structures," he suggested.

Libraries of data structure and code generation specifications either machine-dependent or -independent, can be supplied, he said.

(Continued on Page 42)

CW At Wescon

Decision Data Test-Marketing System 4 for Small Businesses

By Patrick Ward
And Molly Upton
Of the CW Staff

HORSHAM, Pa. – Decision Data Computer Corp., supplier of small-business system peripherals, is test marketing its own small business system – the System 4 – in the Philadelphia area.

The firm is not ready to support the system nationwide, according to Loren Schultz, Decision Data president. After the company has installed about 20 systems in the Philadelphia area, however, it may expand its marketing effort into the New York City region, he said.

Decision Data's move to broaden its product line followed a decline in OEM orders during the first half of this year.

The company already makes MOS memory for use on the IBM System/3 Model 10, and this will be incorporated into the new System 4.

The System 4's processor is being offered in both card and disk-oriented configurations. It uses the Intel 8080 microprocessor and is available in 32K, 49K or 65K Mosfet memory.

The price range is $500- to $1,600/mo, with purchase prices starting at $20,000.

(Continued on Page 42)

500 in the Pocket

SAN FRANCISCO – Digital Equipment Corp. already has 500 orders in its pocket for the Decprinter I, unveiled at Wescon here last week, according to George Abbott, product marketing manager.

DEC's entry in the line printer market is expected to be at least as successful as Decwriter I, of which 12,000 have been installed to date.

The printer will be adopted by the Business Systems Group first, and later will be offered on the PDP-8 and PDP-11.

Priced at $1,975 in quantities of 100, the Decprinter I offers a 7 by 7 matrix, upper and lower case and top-of-form command as standard features (see related story on page 35).

Decision Data Testing System 4

(Continued from Page 41)

Like IBM's System/32, the Decision Data System 4 will offer industry application packages, concentrating on manufacturing, order entry/inventory and general accounting because "that's where the need is," Schultz said.

"Forty-eight percent of the users of the System/3 are in manufacturing and maybe 16% are in distribution," he noted.

Decision Data chose RPG-II as the programming language because "there are thousands of people out there who can program in RPG and can also use all the packages floating around," he added.

The company recently added Mosfet memory and 300- and 600 line/min printers to its primarily card-oriented peripherals line.

"The point is we had been providing all those supporting products and had everything but a processor. But there's nothing to processors today, so we developed one," Schultz said.

The System 4 is aimed at companies with up to 250 employees. "There are almost three and one half million companies" in this size range and "only 1% have a computer," he said.

Decision Data, with its 4,000 customers and 70 service centers, feels it has the market base and service capability to launch a small business system, Schultz said.

Financially, "this is a better buy market than our current product line, which is a lease market," he remarked. "We also feel these products have more growth potential than our current products."

Decision Data will handle maintenance for the System 4 itself, but plans to work with software houses to develop application systems, Schultz indicated.

As for its other end-user product lines, business is holding up, Schultz claimed. "People are price-sensitive in a tight economy," he added.

Decision Data's memory, for example, could offer as much as a 70% discount compared with an IBM core unit, he said.

The firm is aiming for a 50-50 split between OEM and end-user business. However, OEMs have been "holding off implementing major special programs," he said.

The firm sells to about 40 different OEM customers, including Burroughs, Honeywell and Digital Equipment Corp., Schultz added.

Loren Schultz

Recession Sparking Software Sales Rise

(Continued from Page 41)

Software AG has doubled its sales in North America in each of the last two years, according to Thomas R. Bernsford, manager of market development.

The firm is receiving three times as many inquiries now than it did at this time a year ago, he said. In the last year and a half, its staff has doubled and its advertising budget has tripled.

"There seem to be more and more study committees" set up by firms to evaluate DBMS, he said. "Users used to decide without evaluating, but now are considering alternatives," he added.

Although the firm had a slow start initially because Adabas, its DBMS, was not developed in the U.S., the product has gained sufficient acceptance to overcome that block, he said.

Software AG now has 15 field technical persons, each handling up to six or eight installations, he said.

The firm has no plans to expand outside of the data base market, he said, observing "it seems a majority of organizations have not made decisions yet on data bases."

Success of Micros Depends on Software

(Continued from Page 41)

Using the translator to optimize the trade-off between memory space and execution time would lessen the burden on the programmer, he indicated.

Block Diagram Language

Granino A. Korn of the Electrical Engineering Department at the University of Arizona outlined a block diagram language.

Such a language would "make it easy for applications-oriented nonprogrammers to generate efficient microcomputer programs without any need to learn Assembly language," he said.

The proposed programming system is "essentially independent of the type of microcomputer used and will also permit convenient and realistic interactive simulation of microcomputer program execution," he said.

Work is being done at the University of Arizona on two block programming systems: Microdare, which is developed from an Extended Basic system requiring no elaborate disk operating system, and Dare/Eleven, he said.

Under-Korn's scheme, a user specifies an analog computer-like block diagram whose block operators specify standard mathematical operations and input/output operations. These operations are implemented as subroutines in the read-only memory (ROM).

An interactive editor/translator program running on a small mini translates the specifications into an address table and loads it into the micro's memory, whether random-access memory (RAM), ROM or programmable read-only memory (Prom), he explained.

The address table specifies successive jumps to the correct standard subroutines in ROM and data fetching/storing operations in RAM, Korn added.

J.E. Bass of Rockwell International's Microelectronics Device Division said the use of distributed processing techniques with micros will reduce the software complexity and development times as well as ROM program requirements.

Redesigning micros for distributed processing can overcome the inherently lower performance of MOS/LSI compared with bipolar technology, he said.

By distributing the intelligence through the system chips, the CPU is involved only in controlling buffer transfers to and from intelligent peripheral controller chips instead of providing detailed control functions, Bass said.

Venture Capital Not Only Choice

Financing Alternatives Urged for Young Companies

By Molly Upton
Of the CW Staff

SAN FRANCISCO – During hard times, young companies should look to funding sources other than venture capital and bank loans, Christian Hoebich, president of Hoebich Venture Management told attendees at the Western Electronic Show and Convention (Wescon) here last week.

Young companies often "overlook or abuse practical sources of capital such as properly utilizing trade credit, tapping customer advances and borrowing money from their landlords," Hoebich said.

Because a growth company should represent a customer of increasing importance, it might be possible to extend a firm's credit to 60 days, he explained.

As the confidence of suppliers is gained by paying within this time, payments might be stretched to 70 or 80 days. However, he emphasized, creditors should be kept informed.

"Careful management of trade credit is one of the most inexpensive sources of capital since it does not cost any interest," he said. "However, be sure to periodically check and compare prices to prevent hidden carrying charges."

One should carefully examine trade-offs, he advised: "It may behoove your company to purchase more subassemblies or even total assemblies so you can exploit more suppliers' credit than by merely buying components."

Risking Bad Impression

Another method is obtaining early payment or even advances from customers. If properly presented, this is a viable option for a young growth company and should be explored in detail, he said.

Hoebich acknowledged many young companies are reluctant to ask their customers for advances because they risk creating the impression the firm is a marginal operation.

A third method, popular in California, is to borrow funds coupled to a long-term lease with a real estate developer. Generally a company can raise $4 to $5 per square foot through this method; the term of the debt is equal to the term of the lease, he explained.

"As long as the developers can sell this property for a higher price based on the increased rent, this interesting alternative may become an increasingly popular method of financing a young company," he observed.

Commercial Finance Companies

Commercial finance companies offer a somewhat more flexible source of capital than banks, William F. Plein, president of Commonwealth Financial Corp., explained.

They emphasize collateral as a basis for a loan while banks emphasize net worth with only secondary consideration for collateral, he said.

Collateral lending can "grow with the needs of emerging companies when they are not most likely to be heavy on collateral and light on tangible net worth," he said.

The most flexible tool offered by commercial finance companies is the accounts receivable financing, whereby funds are made available at the time of shipment at a mutually agreed percentage of the net invoiced amount.

This method usually is done without notification to the customers. The best receivable portfolios are those where the risk is spread rather than concentrated in any one customer, he added.

As sales grow, more capital is available, he said.

A somewhat less flexible method is an inventory loan, which is secured by raw materials and finished products. Advances, usually less than on the accounts receivable, are formulated as a fixed percentage.

Usually these loans are made in connection with an accounts receivable loan, Plein said.

Term loans are somewhat unpopular with most lenders today and are usually made only to accounts receivable borrowers, he said.

Factoring is similar to accounts receivable but requires notification of customers since the commercial finance organization performs bookkeeping and collection services, he said.

The lender also does credit checking and guarantees its clients against credit losses. In this method, the commercial credit firm purchases the accounts receivables for a discount.

A firm can therefore eliminate its credit and accounts receivable departments, at least reducing the cost of the discount, Plein explained.

David G. Arscott of Citicorp Venture Capital, Ltd. (CVC) said the criteria desired by investors center on management, the product or service offered and the financial plan of the firm seeking money.

CW At Wescon

CVC invests in firms with "experienced entrepreneurial businesmen whose backgrounds aid the development of skills needed in company formation and expansion," he said.

Since younger companies usually depend on a limited number of products, the quality of that product and its market potential are especially important, he indicated.

A business plan should include a funding strategy for three to five years. "This plan could include bank and lease financing sources and should address the question of raising additional capital for expansion," Arscott said.

"The importance of planning credit cannot be overemphasized. Planning is the key to companies, regardless of size, but it is especially needed in new or young enterprises," he said.

In addition, a "disaster plan" developed by top management to deal with unexpected but possible contingencies is advisable, he said.

'Cost of Ownership' Emphasized

Lower Cost of Printers Linked to Mini Market Growth

By Molly Upton
Of the CW Staff

SAN FRANCISCO – The growth of the minicomputer market has influenced the trend toward lower cost printers and lower cost of operation, Ted L. Nichols of General Automation, Inc. (GA) told attendees at a Wescon session.

Future trends to counter increased paper costs include more concentrated print capability as well as the ability to use recycled paper, he said. Nichols is GA's manager of peripheral products.

"This emphasis on lowering the operating cost shows a maturing of the industry and a recognition of the total cost of ownership," he told attendees at a session entitled "So You Want a Printer for Your Mini or Microcomputer System?"

Nichols predicted nonimpact printers will probably be the leading printing technique in the early 1980s. "The chain, train and band technologies are taking over and probably will be in the forefront during the next five years," he said.

CW At Wescon

At first, emphasis in the industry was on achieving suitable reliability, then on print quality. With the advent of minicomputers, the emphasis on cost arose, he said.

With the growth of the minicomputer applications, printer makers have filled the void that previously existed between the $1,000 and $50,000 printers, he said.

Current constraints for mini and micro applications are "such things as network data rates for communications-oriented applications, the processor time available in multiprocessing industrial applications or perhaps even the CPU speed itself in LSI microcomputers," he said.

In selecting the printer for minicomputers and microcomputers, buyers should examine thoroughly the financial aspects, evaluate the particular application and the manufacturer, he said.

The financial aspects of selection include the costs of operation, integration and support as well as the initial investment, he said.

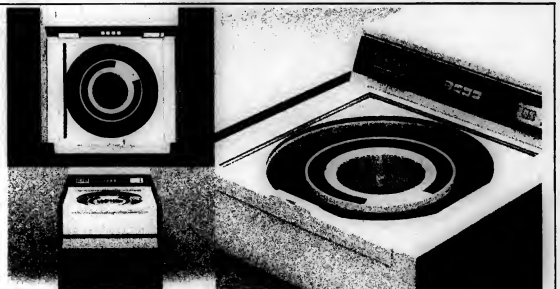
In evaluating the application, the buyer should consider print volume, data source, formats, copies, environmental constraints, maintenance plans and financial considerations, Nichols said.

To select a supplier, one should look at the basis for cost comparisons, vendor support, commitments and agreements and how to determine the vendor's quality awareness, he said.

In determining costs of printers, Nichols told prospective buyers to look at the cost over the life of the product.

Once operating costs are established, one can determine the operating costs per line or per month by knowing the volume of printing required, he said.

The cost of integrating the printer into the system should be added to the cost of the system, and support costs should be identified. For example, to put two products on an equal basis for a life cost evaluation, it may be necessary to include refurbishment expenses as well, he said.



Overriding Criterion

Because the higher the speed, the lower the cost per page, the printer speed requirement is "perhaps the overriding criterion in establishing the application requirements," he said.

This general guideline exists despite the fact that unit cost generally rises with the speed of the printer.

Although the workload per day or per shift is "adequate for an off-line print station, the peak load on an hourly basis is a better criteria for one-line units," he said.

In evaluating the choices for specific applications, the parameter of speed of operation is "rather deceptive for most applications," he observed.

Line length and carriage return techniques can affect the printing speed of character-oriented printers, he observed.

Seldom-quoted specifications, although often important in affecting throughput, are the time required for carriage return and line-spacing operation, he said.

Line printer speeds are also affected by variables such as the size of the character set, response time and the transfer rate of the data source, he said.

Other application criteria are data source and print format.

If preprinted forms are to be used, nonimpact printers usually are not applicable, he said.

Another consideration, for which specifications are difficult to obtain, is noise. These specs are hard to compare due to the variances in measuring conditions.

Elimination Easy

"Provided the application requirements have been clearly defined, it is fairly easy to eliminate most of" the 200 or more printers available, Nichols said.

The evaluation of the eligible units is primarily a matter of trade-offs, he said. "Product performance, features, reliability and support are measured against initial prices and continuing costs on a product life basis," he said.

Features to benefit both the logic designer, system engineer, use and maintenance personnel all need to be considered, he said.

Orders & Installations

Allegheny General Hospital has ordered a **Burroughs B4700** computer system with dual central processors and approximately 90 terminal systems to be used in a data communications network.

Statistical Tabulating Corp. has ordered 11 System 380s with 127 keystations from Entrex, Inc. to replace existing data entry equipment.

The U.S. Railway Association has ordered the Model 204 data base management system from Computer Corp. of America to set up a data base describing the geography of the northeast U.S.

Thirty NCR 279 terminals have been installed at teller windows and other customer service areas of Western Bank of Houston in a move toward implementating a real-time central information file.

Alterman Brothers of Atlanta has ordered a Univac 90/30 for use in its institutional food distribution operations.

The Tano Corp. will install a computer-controlled test set at the *St. Petersburg Times* to facilitate testing and maintenance of the newspaper computer system.

Johnson County, Iowa, has ordered a Hewlett-Packard 3000 Model 50CX mini to carry out the statistical operations of its government departments.

A computer-assisted instruction system designed by the Computer Curriculum Corp. has been installed in the Fort Worth, Texas, Independent School District.

The Johnson Space Center has installed two System 2000s from MRI Systems Corp.

General Electric Credit Corp. has ordered Bunker Ramo's System 90 programmable video terminals and GE teleprinters to provide an on-line inquiry/response system to perform credit functions.

Palais Royal, a department store chain, has installed a credit authorization system designed and built by TRW Data Systems.

Standard Oil Co. of Ohio has ordered two Key-Edit 1000 systems and one Key-Edit 60 system for daily data entry requirements.

Blyth Eastman Dillon and Co. has ordered 100 visual display units controlled by SPD 20/20 terminal processing units and 50 SPD P-100 high-speed printers from Incoterm Corp.

The Consumer Electronics Division of RCA Corp. has ordered a Univac 90/70 system as part of its plan to consolidate all DP for the division.

Dow-Badische Co. has ordered two Hewlett-Packard 3000CX minis to act as remote job entry stations for the company's computer center.

POSITION ANNOUNCEMENTS

PROGRAMMER

Florida financial institution seeks ambitious individual experienced in IBM DOS/US and TASKMASTER. Able in using this monitor to combine efficient analysis and programming while addressing the needs of on-line users. Candidate should have two years minimum direct experience in designing and coding application program modules with in-depth understanding of TASKMASTER internals. Bank familiarity, programmable frontends W/D BTAM, and SANDERS terminals is preferred.

Send confidential resume and salary requirements to: Personnel Department, Atlantic Bancorporation, General Mail Center, Jacksonville, Florida 32203.

EQUAL OPPORTUNITY EMPLOYER

PROGRAMMER/ANALYST

Interesting and challenging opportunity for individual who is more than just a programmer to work with our customers on data base management systems. Applicants must have a good knowledge of PL/1 in an online or OS/370 environment. Mfg. background also helpful. Mitrol is an established company providing management systems to many of the leading industrial companies. Excellent potential for rapid advancement.

For further information call or write John McFarlend at:

MITROL

1050 Waltham Street
Lexington, Mass. 02173
(617) 862-5350

Director Computing Operations

Continue your career on the forefront of Computing and Computer Networking. Responsible for the operational activities and planning related to the overall department under charge of providing:

e) for the development and delivery of academic and administrative computing services at IUPUI;

b) the interactive computing services to 8 Indiana University campuses via the Indiana University computer network.

Major equipment at Indianapolis includes DEC KI 10 (5.07 A) and IBM 360/44 (DOS 26.2). Major equipment accessed at Bloomington includes CDC 6600 (Kronos 2.1) and IBM 370/158 (OS/VS2).

Operations' professionel, technicel and clerical staff numbers 25. Expenditure level approximates $900,000.

Qualifications: Bachelor's Degree in Business Administration or other related field; candidetas must have successful supervisory and menegerial experience in computing of at leest 5 years.

Send resume and salary history to:

INDIANA UNIVERSITY PURDUE UNIVERSITY at INDIANAPOLIS

Personnel Office
1100 West Michigan St.
Indianapios, Ind. 46202
An equal opportunity employer M/F

ADMINISTRATION DIRECTOR EDP

Starting Salary $22-24,500

The Wisconsin Department of Revenue, assuming greater responsibilities in the development of state fiscal and tax policies, has e need to attract top professionels. We have en immeidete career opportunity for e skilled administretor to direct our systems and data processing bureau. This position requires an innovetive thinker who can apply systems end EDP knowledge towerds the development, installetion and evelustion of complex administretive procedures for large scale operations. You'll take an overview of departmentel policies and procedurer while directing e steff of approximetely 100.

A minimum of 3 years date processing top menegement end supervisory experience is required. Your combination of telents and carter motivetion plus the uniquely progressive environment in Madison make this e situation worth looking into.

For e Stete of Wisconsin application, contact:

DEPT. OF REVENUE
PERSONNEL SERVICES
201 E. Washington
Madison, Wisconsin 53702
(608) 266-2679 or 266-3842

All applications must be received by October 8, 1975.
We are an equal opportunity employer and encourage females and minorities to apply.

Data Processing

If you are interested in relocating to the beautiful Pacific Northwest, we currently have several excellent positions. Banking experise preferred in medium to large S360/370 environment.

Jim Morris or Bill Parfitt
Houser, Martin, Morris
& Associates
1621 114th S.E. #210
Bellevue, Washington 98004
(206) 455-8600

At Robert Half, your counselor is a EDP professional.

We figure it takes one to know one.

Whether you're seeking employment or employees in any of these specialized areas, you can be sure the person you speak with at Robert Half understands the field from your side. Call any Robert Half office, we speak your language.

ROBERT HALF
PERSONNEL AGENCIES

Specialists in Finance, Banking, Accounting and EDP.

Albuquerque / Allentown / Atlanta / Baltimore / Boston / Buffalo / Charlotte / Chicago / Cincinnati / Cleveland / Columbus / Dallas / Denver / Detroit / Fort Lauderdale / Houston / Kansas City / Los Angeles / Lancaster / Long Island / Los Angeles / Louisville / Memphis / Miami / Milwaukee / Minneapolis / Newark / New York / Oakland / Omaha / Orange, Cal. / Philadelphia / Phoenix / Pittsburgh / Portland / Providence / San Diego / San Francisco / San Jose / Scranton / Seattle / St. Louis / Stamford / Tampa / Washington, D.C. / Wilmington

London, England / Toronto, Canada / Vancouver, B.C.

OPPORTUNITIES IN WEST AFRICA

Professor of Finance and Professor of Computer Science for Nigerian Universities. Both require Ph.D., undergraduate and graduate teaching experience. Two year tours, good benefits. Statistician for Francophone Africa. Requires MS/Statistics, Fortran, complete French fluency. Two year tour, good benefits.

Resumes: Box W
TransCentury Corp,
1776 Columbia Rd., N.W.
Washington, D.C. 20009
An equal opportunity employer

SYSTEMS ANALYST

Montgomery College, e community college in suburben Meryland has en immediete opening for e Systems Analyst with e college degree, knowledge of COBOL, and 4 years experience with systems design, preferably including reel time applications with e data base environment. The position requires an ability to design and implement student-related and financial applications for e multi-campus college, and to work in both reel time end batch systems. This person must have good communication skills, and must be capable of dealing effectively with users, evaluating alternatives in terms of optimizing goal achievement end user satisfaction. Starting salery range $18,000 to $24,650 plus excellent fringe benefits. Send resume including salery requirements to Montgomery College, Personnel Office, 51 Mennakee Street, Rockville, Maryland 20850, by September 26, 1975.

AN EQUAL OPPORTUNITY
AFFIRMATIVE ACTION EMPLOYER

NCR

HARDWARE/SOFTWARE PUBLICATIONS SPECIALISTS

Our Marketing Publications Department has immediate openings for Hardware/Software Publications Specialists to provide publications support for rapidly expanding EDP product line.

If you have experience or aptitude in writing and if you have e background in servicing or programming EDP systems and terminals, you may qualify for challenging career position writing hardware and software publications for the many new, exciting products and systems now being released.

Send resume and salary requirements to:
Marketing Placement — Dept. 2849
NCR Corporation
Dayton, Ohio 45479
An Equal Opportunity Employer

"Manager-Systems and Programming"

New growth-oriented company has an immediate opening for manager of Systems and Programming. This position requires 5-10 years experience in Data Processing with prior systems and programming menagement. Extensive experience in design of business systems, data bases, data communications and COBOL Programming. Must possess excellent communication skills. If Qualified and interested send resume and salary history to:

FEDERAL EXPRESS CORP.
AMF Box 30187
Memphis, Tenn. 38130
An Equal Opportunity Employer

SENIOR SYSTEMS PROGRAMMER
SENIOR SYSTEMS ANALYST

Blue Cross of Western Pennsylvania

is currenctly seeking candidetes for these positions:

SENIOR SYSTEMS PROGRAMMER

Responsibilities include equipment end software planning activities, plus evelustion and consultetion support duties. Candidetes should have 5 years' systems and programming experience, including 4 years as an IBM 360/370 systems programmer. This experience also should include equipment planning, system configuration, performance measurement, software evelustion end implementation, and familiarity with IMS and CICS.

SENIOR SYSTEMS ANALYST

Responsibilities include plenning, developing, and monitoring assigned systems implementation, including feasibility studies, systems project plens end proposal development, systems package evelustion, and project cost monitoring. Candidates should have 8 years' IBM systems and programming experience, including background in 370 On-Line operating systems and communications software.

Both positions involve up to 30% trevel

Send resume stating work history, educational background end present salery to:
W.C. Cunningham
Personnel Department

Blue Cross
of Western Pennsylvania
One Smithfield Street
Pittsburgh, Pennsylvania 18222
An Equal Opportunity Employer M/F

® Registered Mark Blue Cross Association

position announcements | position announcements | position announcements | position announcements | position announcements

corporate manager systems&programming

An excellent opportunity exists to join our expanding, fast paced organization. Miller's growth is dynamic, we had a 31% sales increase last year and a cumulative gain of 60% for the past two years.

As a member of our management team, you will be responsible for planning, organizing and controlling the systems and programming activities of the company. In addition, you will supervise a staff of 26 professional analysts and have exposure to all levels of management. Our current environment is an 18M 370/145 DOS/VS with plans to expand to OS in 1976. Our new systems are being designed in the latest TP/Data Base Concepts.

If you are degreed with 4-5 years of MIS management experience with a successful track record of major systems implementation, we want to challenge you. We offer an attractive starting salary, an excellent relocation package and a generous benefits program. Submit your resume with salary history to: N. Williams, Dept. 8556, Corporate Recruiting, Miller Brewing Company, 4000 West State St., Milwaukee, Wisconsin 53208.

Miller

An equal opportunity employer M/F

ON-LINE MOTOR FREIGHT SYSTEM 'COBIS' SOFTWARE SPECIALIST

- Individual must be fully qualified to support the on-line transportation system known as 'Cobis' in a service bureau environment.
- Must have sufficient overall motor freight system concept experience to assist in the development and maintenance of the teleprocessing system.
- Desired applicant should have a minimum of 2 years experience in on-line motor freight systems.
- We are the exclusive Canadian organization for the 'Cobis' system and work closely with our U.S. counterparts both in research and development as well as technical support. We presently have one customer with over 70 terminals on-line and a second customer installing approximately 85 terminals.
- This is a permanent position in a young expending company and country. The present 370-155 computer will be updated to a 370-165-II this year.

If you meet our requirements, send resume and salary history in confidence to:

A.M. Docherty
TMS MANAGEMENT SERVICES LTD.
23 Westmore Drive, Suite 301
Rexdale, Ontario, Canada
M9V 3Y7

NCR

DATA PROCESSING DIVISION - WICHITA

In considering the job you have today, you have to consider tomorrow. In fact, you have to consider a series of tomorrows that form your future.

NCR's Data Processing Division - Wichita offers opportunities for ambitious individuals who are willing to look beyond today and tomorrow. Opportunities for Professionals seeking a pleasant working and living environment. For career minded people who are willing to be measured by their performance... for those who want personal growth, technical development, responsibility and diversity.

Systems Software Programmers

- FIRMWARE DEVELOPMENT
- MINICOMPUTER OPERATING SYSTEMS
- COMMUNICATIONS
- FILE MANAGEMENT
- ASSEMBLERS
- COMPILERS

We presently have openings for experienced Systems Software Programmers. Opportunities exist in the design, implementation and support of minicomputer operating systems, communications, file management, assemblers and compilers. Senior positions in processor design with emphasis on data communications and operating systems for business systems.

If you are qualified and interested in any of the above opportunities, please send complete resume including salary history and requirements to Mr. Ron Clarke, Professional Placement, P.O. Box 1597CW, Wichita, Kansas 67201.

An Equal Opportunity Employer

AUDITOR EDP

Sys 3 exp. Attractive upstate NY community. Ability to interface with mgmt & programming skills. Audit exp. not necessary. $21K. Fee paid.

ROBERT HALF PERSONNEL AGENCIES
330 Madison Avenue
New York, N.Y. 10017
(212) 986-1300

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

PROGRAMMING MANAGER

Step up to Management with a large financial institution that offers a MGMT spot if you have superv exp & are strong in COBOL. 360 shop. $24K. Fee paid

ROBERT HALF PERSONNEL AGENCIES
330 Madison Avenue
New York, N.Y. 10017
(212) 986-1300

Itty Bitty Monopoly

Customer Service Engineers

We're specialists in ibm "Customer Engineer" Extractions

Salary $1300-$1800/month
8724 W. Diversey Av.
Chicago, Ill. 60639
(312) 622-7711

Ahl Associates

PROGRAMMER SYSTEMS

Looking to design systems? Know OS/VS internals as utilities. TP & DB conv to 370/158. Good future. $19K. FEE PAID

ROBERT HALF PERSONNEL AGENCIES
330 Madison Avenue
New York, N.Y. 10017
(212) 986-1300

SYSTEMS PROGRAMMER

Must know DOS and DOS/VS. Growth and expansion finds us seeking people who will help train customers, assist in installation of our widely used software packages—GRASP, EPAT, FMAINT, GRASPVS and provide real solutions to software problems. If you are a pro in commercial DOS and DOS/VS we will match your capabilities with compensation. Send resume or contact:

R.F. FRANCO
SCI
2480 Lemoine Avenue
Fort Lee, New Jersey 07024
(201) 461-3120

PROGRAMMER

If you're ready to set your own course with a Big corp that offers State-of-the-art exposure, challenge, growth & salary . . this is it. COBOL + JCL exp. Start $18,000. FEE PAID

ROBERT HALF PERSONNEL AGENCIES
330 Madison Avenue
New York, N.Y. 10017
(212) 986-1300

IMS APPLICATIONS PROGRAMMERS

Allegheny Airlines has immediate openings for experienced Applications Programmers for 360/370 IMS BATCH/TP, working in project environments. Convenient, modern facilities. Excellent company benefits including air travel. Salary commensurate with experience.

Applicants interested in a rewarding career should submit resume and salary requirements in confidence to:

H.E. Rowson
Allegheny Airlines, Inc.
Washington National Airport
Washington, D.C. 20001

Allegheny Airlines Inc.

America's 6th largest passenger-carrying airline

An equal opportunity employer M/F

HONEYWELL/GE

PROGRAMMER ANALYST

The Chicago office of a "big 8" international CPA firm seeks a competent Programmer/Analyst to join it's systems and EDP consulting staff. Qualified candidates must have 2 or more years programming experience with Honeywell/GE H-636 computers utilizing GCOS software and IDS data management software. On-line communications experience is desirable.

For the independent self-starter type of person, we offer the opportunity to develop into a broad range EDP consultant involved in a variety of applications and industries including design and implementation of on-line systems.

Compensation and benefits are excellent. If consulting in a professional environment appeals to you, send your resume or letter including salary history to:

CW Box 4480
797 Washington St.
Newton, Mass. 02160
An equal opportunity employer M/F

Software Development Engineers

CAREER MOVING LIKE A SUNDIAL ON A FOGGY DAY?

If you know time is passing, but can't see yourself moving ahead professionally, maybe the time has come for you to cast your shadow elsewhere. ITT Telecommunications could be a good choice. We are established and recognized internationally as a leader in the high-demand field of modern telephone central office switching systems. Here in suburban Chicago, we offer opportunities to move ahead with us into more advanced systems.

We have immediate openings for Software Development Engineers whose background should include 3 or more years of realtime programming in machine language. Call processing, diagnostic and maintenance programming are a plus. Direct telephone experience is preferred but not mandatory.

Several of these positions can result in Paris, France assignment for 1-2 years.

With ITT Telecommunications, you'll work on challenging assignments in a truly professional atmosphere — and you will enjoy an excellent starting salary with a competitive benefits package.

If you have the above experience, please contact Tom Edminson at ITT Telecommunications, 2000 S. Wolf Road, Des Plaines, Illinois 60018.

TELECOMMUNICATIONS ITT SWITCHING CENTER

An equal opportunity employer M/F

position announcements

SYSTEMS ANALYST

Experience in COBOL, AUTOCODER, SPS qualifies for Northern New England position. Insurance & accounting sytes backgd helpful, but not nec. Salary to $14,000 (fee paid). Contact Stan Durbee

ROBERT HALF PERSONNEL AGENCIES
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

Director of Information Systems
Responsible for operation and development of University Computer Center and Data Processing unit. Information Systems experience and several years in administration required with demonstrated ability to deal responsibly with faculty, staff and students. Will direct staff in design and implement new services, and experiance with private, federal, and state grant programs. Doctorate in computer science or related area and record of scholarly achievement through publication preferred. Salary negotiable. Inquire to Dean Joseph Sam, Chairman, Search Committee, University of Miami, Coral Gables, Fla. 33677 by October 31, 1975.
An equal opportunity employer.

EDP Men & Woman
A Golden Opportunity

You can earn thousands of extra dollers while still retaining your present position by selling computer ribbons, computer tapes and typewriter ribbons. Menufacturer pays commission each month. Terrific repeat business. Write to:

CW Box 4374
797 Washington St.
Newton, Mass. 02180

PROGRAMMER/ ANALYST

If you're ready to set your own course with a big corporation that offers exc. with State-of-the-art, data base & telecommunications exposure, challenge, growth & salary ...this is it. COBOL & JCL exp. Start $19K. Fee paid.

ROBERT HALF PERSONNEL AGENCIES
330 Madison Avenue
New York, N.Y. 10017
(212) 888-1300

position announcements

CONFIDENTIAL...
FEE PAID OPPORTUNITIES?

Romac has them.

Our 14 Romac partners have successfully placed:

Systems Managers
Tech Project Leaders
Systems Programmers
Programming Managers
Applications Programmers

All in confidence, All fee paid

ROMAC
& ASSOCIATES/Personnel Consultants
Contact: Richard Romac, President H.S. Dunn at: 125 High St., Boston, Ma., 02110, for information on our network Partners in Manchester, New Hampshire; Providence, Rhode Island; Buffalo, Rochester, Syracuse, New York; Philadelphia, Pa., Baltimore, Washington, D.C., Charlotte and Atlanta.

SYSTEMS PROGRAMMER

Join one of the fastest growing companies in the supermarket industry!

Our Boise, Idaho-based corporate office has a position available for a Systems Programmer with the ability to generate and maintain OS-MFT/HASP operating system and also provide technical support to programming and operations staff. Experiance in BAL and COBOL programming necessary. Teleprocessing experiance helpful.

ALBERTSONS offers excellent salaries, a comprehensive benefits package and a professional opportunity in an incomparable Idaho setting. For consideration, send resume, including salary history, to S.K. Noack, Personnel Department.

ALBERTSON'S INC.
P.O. Box 20
Boise, Idaho 83726
An equal opportunity employer

An equal opportunity employer

IMS? Total? New England, New York & Detroit.

If you are a programmar or programmer/analyst with 2-5 years commercial applications experience in COBOL, Keane would like to talk with you. IMS, Total, CICS design and programming experience a definite plus.

Keane is one of the nation's largest applications systems developers, with a client base in excess of 300 companies.

Our working environment and salary, benefit and professional growth programs are the best in the industry. Send your resume to Barbara Kenyon at our home office in Wellesley, or in Detroit to: David Sobocinski, 155 Big Beaver Road, Troy, Michigan 48084.

Keane: The software professional's career path.

KEANE ASSOCIATES, INC.
36 Washington Street, Wellesley Hills, Mass 02181

position announcements

SR. PROGRAMMER ANALYST

Chicago Area

Large specialized production systems.

System definition and design 2-3 yrs heavy OS/BAL experience. DOS helpful, but not necessary. Salary commensurate with experience and ability.

Send resume (formal not required) and salary history to:

CW Box 4476
797 Washington St.
Newton, Mass. 02180

SYSTEMS MGR

Step up to management with a leading retail chain that offers management spot if you're capable of designing sophisticated merchandise planning & reporting systems. $22X. Fee Paid.

ROBERT HALF PERSONNEL AGENCIES
330 Madison Avenue
New York, N.Y. 10017
(212) 888-1300

BUY SELL SWAP

1130
1401

Systems & Components
New Low Prices
Purchase - Lease

CMI Corporation
23000 Mack Avenue
St. Clair Shores, Michigan, 48080
(313) 774-9500
TWX 810-224-5706
Member Computer Dealers Association

FOR SALE OR LEASE
IBM 3420/003, 005 or 007
Tape Drive
3803/002 Tape Controllers
3330/001 or 011 Disks
3333/001 or 011 Disks
3830/001 or 002 Disk Cont.
CALL OR WRITE

For Sale or Lease
By Owner
USED IBM 158 MEMORY

Up to 1-1/2 Meg Available in 1/2 Meg Increments
CONTACT Ted Moulder
(212)747-0549

FOR IMMEDIATE SALE

High-Speed I/O Set
1403-N1 2821-1 2540-1

Wanted:
370/155
370/158

Thomas Nationwide Computer Corp.
800 N. McClurg Ct.
Chicago, Ill. 60611
(312) 944-1401

buy sell swap

Correction Notice!

Due to an oversight, Key Equipment Corp.'s ad did not run within the classified section of *Computerworld's* Sept. 17 issue. Please see their current ad on page 50 of this issue.

WANTED FOR CASH

Used Computers & IBM's

IBM:
370/135, 145, 155, 158 CPUs
360/30/40/50/65/System 3
1130, 1401, 1440, 1800, 1450.
Tape, Disc Drives: 1311, 2311
2401, 2402, 2403, 2415, 2319.
Printers: 1403-2, 1403 N1,
Card Punches: 1442(N1), 2540.
Card Readers: 2501, 2680.
Mag. Readers: 1412, 1419.
Control Units: 2821, 1419.
Key Punches: 029, 129, 1050.
Key Punches: 024, 026, 526.
Reproducers: 519 (W. Sense)
Interpreters: 548, 557, 552.
NCR:
Bank Proof Models: 450, 482.
Bank Tellers: 41, 42, 430-11.
Hotel Models: 42-28-1(682).
Op. Scanners: 420-1, 420-2.
Computronics: 2441, 2442.
Sanitary: 36, 50, 2-1(436).
Class 32: 50, 2-1(436).
400-769, 390-500, 400-11-2.
Burroughs: Bank Teller Models:
16-10-53, 7715-440.
F5211, F5212, F6211, F6212.
F5203PV, F5503PV, L2361,
L3111-608, L4311-609, L5012.
Flexowriters: 2302, 2303, 5635.
Univac: 1005, 9200, 9300, 418-3.
Xerox Computers: 840 EPS.

Advise Model, Serials for Quotations.
L.A. Pearl c/o L.A. Pearl Co. 136 E. 57th St., New York, N.Y. 10022
(212) 679-6535.

For Sale:
(2) Olivetti #P203 Bookkeeping Machines

Four years old. Can be programmed for Accounts Receivable, Accounts Payable, and Payroll. In excellent condition. Will sacrifice for $1,000.00 each.
Atlas Merchandising Co.
138 McKeen Avenue
Charleroi, Pa. 15022
phone (412) 489-9661
ask for Rose

FOR SALE OR LEASE
IBM 370/145 IH2 W/ISC
5X4C IH2 3330 Equivalent

FOR LEASE
IBM 370/135 H Short Term Lease Available. Attractive Rates

WANTED
IBM 370/155 W/ or W/O OAT
IBM 370/145 H00 or H2

Contact: Bob Guike
Unicom Computer Co.
2300 Bridgeway Blvd.
Sausalito, Ca. 94965
(415) 332-2445
TWX 910-482-6458

HARDWARE FOR SALE

Quantity	Product	
1	1704	Computer-4K
1	1705	Interrupt Data Chanl
1	1711	Teletypewriter
1	1742	Line Printer Cntrlr
1	1732	Mag Tape Cntrlr-1x8
1	915	OCR Page Reader
1	1735	Page Reader Cntrlr*
1	609	Mag Tape Transport
1	609	Mag Tape Transport
1	1708	Storage Increment-4K
1	1708	Storage Increment-4K
1	1708	Storage Increment-4K
1	1708	Storage Increment-4K
1	1708	Storage Increment-4K
1	915	OCR Page Reader
1	1735	Page Reader Cntrlr
1	1708	Storage Increment-4K
1	1708	Storage Increment-4K

CW Box 4479
797 Washington St.
Newton, Mass. 02180

IBM
FEATURES FOR SALE

CHCS
Computer Hardware Consultants & Services

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

BUYING OR SELLING GO GREYHOUND

Consider us your computer resale specialists. Our staff is available to assist you nationwide in buying, selling, trading, or leasing computer equipment. Just call:

New York	Dick Ventola	(914) 949-1515
Chicago	Pete Ahern	(312) 751-5460
Dallas	M. W. "Bill" Tucker	(214) 233-1818
Phoenix	Tom Tekash	(602) 248-0978
San Francisco	Henry Paulson	(415) 989-4033

Greyhound Computer Corporation — Greyhound Tower — Phoenix, Arizona 85077

WANTED
FOR SALE
BUYING

L&A Computer Industries, Inc.
Fox Hill Office Park • 10955 Granada
Overland Park, Ks 66211 • (913) 381-7272

WANTED
ALL 360 SYSTEMS

360/50 1440 2311 360/20 360/40 360/30 360/25

CC CORPORATE COMPUTERS, INC.
115 Mason St., Greenwich, Conn. 06830 (203) 661-1500
Member Computer Dealers Association

370	360	1.0	MISC.
3145	2020	1403	2401
3158	2030	1443	2803
3165	2040	2314	2913
3360	2050	3211	CORE
3345	2065	3803	

BUY — SELL — LEASE
ALL THE ABOVE & MORE
Pioneer Computer Marketing
2636 Farrington
Dallas, Texas 75207
(214) 637-0950
Member Computer Dealers Association

ATTENTION: NCR CENTURY USERS

NEAT/3 TO COBOL

GUARANTEED 100% CONVERSION
All Programs and Files

ANY COBOL ... NCR, BURROUGHS, HONEYWELL, UNIVAC .....IBM, 360, 370, SYSTEM/3 OS, DOS, VS

For more information write or call

Durham and Associates
7321 Washington Ave. South
Minneapolis, Minn. 55435
(612) 941-7224

ONE DAY SHIPMENT
from our 42,000 sq. ft. facility

FOR SALE

HIS 200/2000
- MEMORY • CPU
- PERIPHERALS

UNIVAC
- 1108-11
- 70/45 SYSTEM
- 9200 • 1004/5

IBM
- 360/65 System Early '76
- 360/30 • 2314

DEC
- PDP 8, 9, 10, 11, 15
- CPU • MEMORY
- PERIPHERALS

617-261-1100
AMERICAN USED COMPUTER CORP
P.O. Box 65, Kenmore Station
Boston, Mass. 02215
Member Computer Dealers Assoc.

SALE OR LEASE
IBM Unit Record

024-$350	088-$1500
026-$1000	402-$900
029-$2900	403-$1000
046-$1800	407-$1500
047-$2500	514-$900
056-$250	519-$1200
057-$1500	548-$1200
077-$500	552-$1200
082-$900	552-$1200
083-$2200	557-$2500
084-$2500	602-$400
085-$1200	729-$750
088-$2900	1401 System-$11,000

THOMAS COMPUTER CORPORATION
Suite 3807-A
600 N. McClurg Court
Chicago, Ill. 60611
(312) 944-1401

FOR SALE
Available Immediately
IBM 3211-1
Printer S.N. 10557
IBM 3811-1
Printer Control Unit
S.N. 10567
IBM 3216-1 Interchangeable
Train Cartridge S.N. 12723
82% of IBM
Purchase Price
Also Available for Lease
Systems Marketing, Inc.
100 West Clarendon
Suite 1562
Phoenix, Ariz. 85013
(602) 248-0457

ACS
WANTED
IBM 029
KEYPUNCHES
FOR SALE
8K & 12K 1440
DISK SYSTEMS
7335 TAPE DRIVE
FOR 1440 SYSTEM
Member Computer Dealers Assoc.
ACS Equipment Corporation
8928 Spring Branch Drive
Houston, Tx 77055
(713) 461-1333

WANTED TO PURCHASE
IBM 370/135
PRINCIPALS ONLY
A.M.G. Equipment Services, Inc.
99 Wall Street
New York, N.Y. 10005
(212) 747-0670

MODEL CA36
TYPEWRITER
1,650
CHARACTERS PER SECOND

For a limited time we will offer a trade-in allowance of $400 for each teletypewriter against the above price.

TRANSNET CORP

TELETYPE SYSTEMS
NEW/REMANUFACTURED
•ALL MODELS
•PARTS & ACCESSORIES
•TWX & TELEX TERMINALS
IMMEDIATE DELIVERY
Wanted: Used TTY SYSTEMS
vardon & assocates, inc.
214/352-7502 • TWX 910-860-5761

WANTED
TELETYPE® EQUIPMENT
New • Used • Parts
— ALSO —
- Data Terminals
- Peripherals
- Mini-Computers
- Modems

Contact us for data terminal sales, service, supplies and rentals.
TERMINAL SYSTEMS INC.
11300 Hartland St.
N. Hollywood, Calif. 91605
213-765-6772 TWX 910-495-2675

WANTED
BURROUGHS
L SERIES
TL 500 14 70
208 31 12 33 32
481 482
Call Stuart Rubinstein
I.O.A. Data Corp.
(212) 673-9300
Member Computer Dealer Assoc.

IBM UNIT RECORD EQUIPMENT — IBM COMPUTERS

024	083	402	523
026	084	403	548
029	085	407	552
056	087	408	557
077	088	514	602
082	089	519	604

We Buy, Sell or Lease
360 - 20
System 3
1130

Special Sale
029's
All Models

Big Savings — up to 50% on Short Term Rentals.
Call us for all your needs. We buy, rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own facility and guaranteed for IBM MAINTENANCE. Call collect, John Ferrara, Vice President, Marketing (212) 421-1000 or write: 420 Lexington Ave. New York, N.Y. 10017 TWX 422357 LMC UT Cable: LMC New York
LMC Data Inc. 630 East 27th Street New York, New York 10016

BUY SELL LEASE

IBM COMPUTERS — 1401's, 360/20's, 30's, 40's, 50's and 65's
UNIT RECORD — 370's, and System 3's. All peripherals. All models available under IBM M/A.
FOR SALE — 360-30-64K System, 1403-2
1442 N1, 2821-2, 2841, 4-2311

LONGHORN COMPUTER LEASING CORP.
3131 Turtle Creek Blvd. Suite (1222)
Dallas, Texas 75219 (214) 522-3170
Member Computer Dealers Association

We are in the process of signing a three year lease with IBM for the following equipment:
1403 Printer
3277 Display Station
5415 Processing Unit
5421 Printer Control
5454 Card Unit
5444 Disk Drive
5445 Disk Drive
Add on Memory
If you manufacture plug to plug compatible hardware that has a significant cost advantage to us, please write with specifics. Non-IBM vendors please do not respond.

C-M Box 4451
797 Washington St.
Newton, Mass. 02160

360/30
WE SPECIALIZE

Will Buy or Sell
Any System or Configuration
Leases Available
CMI Corporation
23000 Mack Avenue
St. Clair Shores, Michigan 48080
(313) 774-9500
TWX 810-226-9708
Member Computer Dealers Assoc.

FOR SALE

Burroughs B-506
CPU 19.2K
Disk-4-9.6 million, 20MS
Tape-2-50KC/556
Printer-1-1040LPM
SPO Control-1
Card Reader-1-200CPM
Fully equipped for Tele-Communications
Including Data Adaptors
Address inquiries to:
Colin Laver
P.O. Box 1473
Manhattan Beach, Calif. 90266

OPPORTUNITY KNOCKS EVERYDAY WHEN YOU CONTACT

dpa

LEASING — SELLING — BUYING — TRADING
IBM COMPUTER — 1401-360-370 ALL TYPES
IBM UNIT RECORD — ALL TYPES AVAILABLE

dpa
DPA, INC.
2636 Farrington
Dallas, Texas 75207
Attn: Gene Nicholl-Chris Brown
AC (214) 637-0950

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

memo

I.T.-

Call I.C.C. @ (213)641-8520- they claim to have an inexpensive 360 type memory — looks like a place to save real $$! M.L.

Memo courtesy of Information Control Corp., 9610 Bellanca Ave., Los Angeles, CA 90045

IBM 360/40

Ready For Delivery Nov.1

CPU	IBM 360/40 2 Channel, 128K
IO EQUIP	2540 Card/Read Punch
	1403 N1 Printer
	2821-Model 1 Control Unit
DISKS	IBM 2314 A1 1x9 High Speed
TAPES	IBM Compatible 2401 Model 5 (4)
	Dual Density

We Will Buy

CPU's (360/30-40-50, 370/135-145), Disks (IBM and IBM Compatible), Tapes (IBM 2401 or Telex Equivalents), Card Equip. and Printers (1403, 1443). Also: IBM 3010 Channel Evaluator.

In Oklahoma City, call Bill McCain 800 Readstone (405) 840-9931 | In Houston, CeS Al Smith Tenny Stannard (713) 444-8240 | In St. Louis, call Ken Steinbeck (314) 727-7010

CSI COMPUTER-SALES,INC.

901 Office Park Plaza/Oklahoma City, Oklahoma 73105

Member Computer Dealers Association

buy·sell·lease·360·3/370

WE WANT TO BUY A 50

For Fall Delivery
Check Our Price
Call the Brokerage Division at:

(312) 671-4410

In Canada Call (416) 621-7060

dearborn

dearborn computer leasing company • chicago • toronto
st louis • cincinnati • member computer lessors assoc

360/65's 370/135 370/145

SHORT TERM LEASES

These systems will be leased directly through CSA and/or come from our existing portfolio.

Contact: D. O'Connor

Computer Systems of America, Inc.

141 Milk Street, Boston, Mass. 02109
(617) 482-4671

BUY, SELL LEASE, TRADE

IBM COMPUTERS
All Types — 1401's, 1440, 1410, 1130, 1620, 360's, 370's, S/3, 3 — All Peripherals

UNIT RECORD EQUIPMENT
All Models — Completely Refurbished and under IBM M/A.

DISK PACKS
Completely Recertified, Guaranteed-Immediate Delivery, Lowest Prices.

Date Automation Co. Inc.
4838 Cash Road, Dallas, Texas 75247
(214) 637-6570 Call Collect
"Member Computer Dealers Assoc."

Lease Buy Sell
DEAL WITH PROFESSIONALS
IN PLACEMENT OF
PRE OWNED
EQUIPMENT
360/370
The National Equip. Wholesale Dealers
COMPUTER WHOLESALE CORP
Suite 1414-M
National Bank of Commerce
New Orleans, La. 70112
(504) 581 7741

DAWNE COMPUTER SERVICES, INC.

Specialist in 360 Features
Buy, Sell, Install, Remove, Trade All 360 CPU And I.O. Features
Contact: Sam Amoreseno
(201) 263-1221
TWX 710-987-8369

We Buy & Sell
Burroughs L Series
New, DEC, Basic hardware & peripherals
NCR Equipment

SALE
Centronics printers
Model 101, Model 101A

Royston Supply
One Arch Street
Wallkill, NY 12589
914) 895-3369

CDC 3000 SERIES

-Memory
-Channels
-Input/Output

Short term lease or sale

Contact: D. O'Connor

Computer Systems of America, Inc.
141 Milk Street
Boston, MA 02109
(617) 482-4671

IBM UNIT RECORD EQUIPMENT

Buy — Sell — Equity Lease
026 056 082 077 514 552 402
029 059 083 085 519 548 407
Also Other IBM Punch Card Equipment.

1620

Components or Systems
Guaranteed Eligible for IBM M/A
Immediate Delivery
Payment Plans to fit your Budget
CALL COLLECT
Mr. Bob Sheets
23200 Mack Avenue
St. Clair Shores, Michigan 48080
(313) 778-9500
TWX 810-235-9798
Member Computer Dealers Assoc.

KEY-EXIMPORT CORP.

P.O. BOX 518 • CLOSTER, N.J. 07624

WE BUY & SELL NCR 31-32-41-42 COMPUTRONICS BURROUGHS L,F and PHILLIPS P-350's SERIES

Call Us First!
OUR DIRECT LINE (201) 767-3444
OR TOLL-FREE 800-631-1595

SYSTEM/3 360/20 1130

BUY • SELL • LEASE

For a prompt, competitive quotation on your IBM needs, call or write today.

"The Small Systems Specialists"

ECONOCOM

Economic Computer Sales, Inc.
1255 Lynnfield Road
P.O. Box 17825
Memphis, Tenn. 38117
(901) 767-9130
TWX 81 0-591-1205
Member Computer Dealers Assoc.

SALE OR LEASE

370/155, 370/145

October

IBM Computer Equipment Specialists in the West

BAY AREA COMPUTER CORP.

37 Quail Court, Suite 3
Walnut Creek, CA 94596

415-944-0323
Jerry Olson
Pat Baker

DECIMUS CORP

1 NEW LEASE PROGRAMS
4&5 Yr. Operating Leases on NEW 370/158 & 370/168

2 DECIMUS will purchase your presently installed 370 and lease it back

3 DECIMUS will take over your present 370/158 lease and upgrade you to a new 370/168 lease

DICK LANIGAN 212-953-0050 | JOHN WANTA 713-444-4970

FOR SALE OR LEASE

1 x 6 Cal Comp
3300 Type Disk Drives
Purchase - $62,000
3 Year Lease - $1,900/month
Available November 1976
Call: Barry D. Kushner
San Francisco Computer Group
(415) 956-3414
Member Computer Dealers Assoc.

SMI

FOR SALE

"DEC"

8-RP03 Type Disc Drives
1-RP10 Disc Controller
With Data Channel
Under DEC Maint.
Available 12/75
CW Box 4477
797 Washington St.
Newton, Mass. 02160

FOR SALE

DECISION DATA

1-9610 interpreting Data Recorder with Computer Interface
1-9645 Printer Reader Punch
Neither Machine has Ever Been in Use
Data Rentals/Sales Inc.
2919 S. LaCienega Blvd.
Culver City, Calif. 90210
(213) 559-3822

DATAPOINT INVENTORY SALE

A $55,000 inventory of new Datepoint equipment is offered at 75% of list — or the best offer received by Sept. 30. Items include:

Five 2200s	Six 402s
Two 460s	Two 404s
One 401	One 400

Call (515) 382-6966
Nevada National Bank
Nevada, Ia.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CMI CORP.
360/20
Nation's Leader
S/3
Components & Systems
Sell — Lease — Buy
CMI Corporation
CMI Building
23000 Mack Avenue
St. Clair Shres, Mich. 48060
(313) 774-6500
TWX 810-226-6708
Member Computer Dealers Association
Ask a CMI Customer
CMI CORP.

We Buy, Sell and Re-furbish Used and New Computer Room Flooring
For Information Call or Write
RAISED COMPUTER FLOORS INC.
174 A Kinderkamack Rd.
Park Ridge, N.J. 07656
(201) 391-3693

CDC 3300
$114,000
32K, 4 channel, floating point, printer, reader, disks, tapes, paper tape.
Ship January '76
Gibbs Enterprises, Inc.
Box 4L
Hingham, Mass. 02043
(617) 878-5287

COMPUTER TAPE DELIVERED
$8.80
2400' Seal/Thinline 1600 bpi
full certified
unconditionally guaranteed
CALL COLLECT

boston (617) 769-4060
new york (212) 867-5661
chicago (312) 266-0100
houston (713) 667-2844
new orleans (504) 522-9295
los angeles (213) 587-1040
san francisco (415) 929-1700
dallas (214) 630-4621
indianapolis (317) 244-1991
washington dc (703) 938-5950

easy load - add $2.00

Wanted
PLOTTER PROSPECTS
If you have needs for graphics equipment or surplus equipment for sale please call or write:
BOB ROE
Romelan Industries
Bank of America Bldg.
Suite 318
San Jose, CA 95113
(408) 292-0517

WANT TO BUY
IBM 360 Model 20 computer with following specifications:

Equipment	Features
2020-D-2	16 K CPU
	1580
	7496
	8099
	8083
2560-A-1	1875
2203-A-1	5558
	9088

2 2311's
Call Curtis Fowler, Stewart, Giles & Co., P.C. area code (612) 244-2536 only if selling price is $30,000 or less.

FOR SALE
Burroughs E-6000
Accounting System
All retail applications other than accounts receivable. Excellent reporting system for one or two stores. Contact J.L. Schwartz V.P. Meyers Arnold, Greenville, S.C. 29602. Tel: 803/242-6411.

FOR LEASE
370 155
with or without
DAT
Ann Arbeit Company
Detroit Michigan
(313) 647-3800
Attn: Tom Brace

B1700
CHAIN PRINTER
For sale by owner, 1 model B9249 chain printer and control, 180 LPM with 48 character set and 2 channel format control, currently under maintenance end being used.
Call 308-276-2131 or write
Miller Manufacturing
P.O. Box 308
Stratton, Neb. 69043

COMPUTER SALES DIVISION
1137 Frito Lay Tower
Dallas, Texas 75235
(214) 358-4471
TELEX 73-0955

BUY • SELL • LEASE
SYSTEM/3
360-370
PERIPHERALS

370/135
CPU for sale with feat. 4655
Complete 135 system for sublease including IFA, IPA, ICA, 3330's, 3420's, and IO set.
Call collect or write:
COMPUTER SYSTEMS/ GRAPHICS INC.
2017 West 104th St.
Leawood, Kansas 66206
(913) 649-2190
Member Computer Dealers Assoc.

IBM 2911 :001 3x2 Manual Switch
(Switches, control units or strings of control units between multiplexors of two 360 or 370 CPU's.)
FOR SALE OR LEASE
Summit Computer Corp.
480 Morris Avenue
Summit, N.J. 07901
(201) 273-6600

1130 SYSTEM
1131-2B
1132-01
1442-05
2501-A1
IBM Meintenance Agreement Available Immediately
CMI Corporation
23000 Mack Avenue
St. Clair Shores, MI 48050
(313) 774-6500
TWX 810-226-6706
Member Computer Dealers Assoc.

MINI COMPUTERS
Buying, Selling? Let us do the work for you and save you time and money!
AVAILABLE NOW:
Novas — all models — new & used; DEC 11's, New 8E's, 8 series, 12; Printers, disc drives, CRT's, etc. Timeshare systems — new & used — & many others.
MINI COMPUTER EXCHANGE
(408) 733-4400
TWX 910-339-9272

SYSTEMS 70 INC.
DATA PROCESSING EQUIPMENT SPECIALISTS
2400 E. Devon Ave., Suite 307,
Des Plaines, IL 60018
(312) 827-9135
360/370
buy·sell·lease·trade

TLW
360-370 market place
BUY SELL LEASE
TLW COMPUTER INDUSTRIES INC.
ATLANTA: 3570 American Drive, Atlanta, Ga. 30341 404-451-1936 TWX 810-757-3654
CHICAGO: 312-295-2930
WASHINGTON, D.C. 202-466-2470
LOS ANGELES: 213-373-6825

SELLING:
370/135H, S/N 61224
360/65 S/N 60925
LEASING:
370/165
BUYING:
370/158 370/135 (TLP OK)
370/155 370/168 (TLP OK)
370/145
IPS COMPUTER MARKETING CORP.
467 Sylvan Avenue,
Englewood Cliffs,
New Jersey 07632
(201) 871-4200,
TWX (710) 991-9677
IPS
"MEMBER COMPUTER DEALERS ASSOCIATION"

The GTS 4010
A 2780/3780 BATCH TERMINAL—*PLUS*

The TERMINAL
2780/3780 COMPATIBLE
350 LPM LINE PRINTER
450 CPM CARD READER

The *PLUS*
16 BIT MINI-COMPUTER
32,000 BYTES OF CORE MEMORY
DUAL DISKETTE, 800,000 BYTES
TTY CONSOLE
DISK OPERATING SYSTEM
FORTRAN IV
BASIC

ALL STANDARD FOR ONLY $29,500.00
(COBOL, OTHER PERIPHERALS AVAILABLE AT EXTRA COST)

General Terminal Systems, Inc.
2960 Electronic Lane, Suite 103
Dallas, Texas 75220 214/357-9249

CDC
FOR SALE OR LEASE
3300 CPU's
3300 Memory 2 or 4 Port
3306 & 3307 Channels
3316 Multiplexers
405 Card Readers 415 Card Punches
604-607 Tape Drives special 9 track tape drives
200 UT's, Data set adaptors, input stations
1700, 3150, 3170, 3500, 6400, 6500 CPU's Memory
505, 501, 512 Printers
854, 814, 8638, 841, 844 Disks & Controllers 863 Drum
Motor Generator sets, 10178-1 32 K Memory Module

WANTED
6681 Data Channels, 6000 ECS, 10178-2 Memory modules
608 Tape Drives, 6600 System CRT's

CONTACT:
COMDISCO INC.
2200 East Devon Ave., Des Plaines, Ill. 60018
312-297-3640 Ken Pontikes
IRISH FINANCIAL CORPORATION
617-777-2159 Barrie Irish
17 Fuller Rd., Middleton, MA. 01949

buy sell swap | buy sell swap | buy sell swap | buy sell swap | time for sale

L&A Computer Industries, Inc.

Fox Hill Office Park • 10955 Granada
Overland Park, Ks 66211 • (913) 381-7272
Member of Computer Dealer Assoc.

COMDISCO
The world's largest IBM computer dealer

selling 370/155, 370/165, 370/158

leasing 370/145 I2, 370/158 JI

buying 370/135, 370/145

WRITE: Comdisco, Inc 2200 East Devon Ave Des Plaines, Ill 60018 TWX 910-233-1478
CALL: 312-297-3640 East 203-359-4814 West 415-944-0323
MEMBER COMPUTER DEALERS ASSOCIATION

PHONE: 315-474-5776
TELEX: 93-7435

Price/Performance Winner 145

Win the price/performance battle with an IBM 145. Your savings are $100,000 to $300,000 when you buy your 145 from CIS.

Model	Date Available	CIS System Number
I2	NOW	165
IH2	9/75	330
I2	10/75	352
I2	11/75	272
HG2	12/75	285

Lease Terms Available

CONTINENTAL INFORMATION SYSTEMS CORPORATION CIS

MIDTOWN PLAZA, SYRACUSE, NEW YORK 13210
CIS EUROPE, SA 80 CHAUSSEE DE CHARLEROI 1060 BRUSSELS
BRUSSELS TELEX: 26025 MEMBER CDA

Opportunities Knock Here.

Computerworld Classifieds could hold the key to your next office.

WANTED TO BUY

2 - 2830 Tape Control Units Model 1
7 - 2401 Tape Drives Model 3

As an option, the above equipment can be formatted in practically any combination of 2401's, 2402's and 2403's. This equipment is required for delivery no later than November 15, 1975 and must qualify for IBM Maintenance Agreement.

Direct written offers to:
M. Meadows, Laclede Gas Co., 720 Olive St.
St. Louis, Mo. 63101
(314) 231-3800, Ext. 272

IN CANADA

We specialize in 360/20, 360/30 & up System 3, 370 Series
We buy your excess IBM Equipment
CMI Company
P.O. Box 693
Windsor, Ontario N9A 6P2
519-258-8910

Want to buy from principal for delivery in Jan. 370/145 I2 or HG2.

CALL:

(501) 664-7483

Needs configuration with detailed specs, serial no, price, and date available.

FOR LEASE

2314 CONTROL UNIT 9 SPINDLES

UNDER IBM MAINT.

USERS INCORPORATED
1703 East Joppa Rd.
Baltimore, Md. 21234
(301) 661-7200
Attn: H. Bullion

COMPUTER USERS:

LINEALERT
Power Monitor
Positively Identifies

- Outages
- Brownouts
- Transients
- 120V 60Hz Operation

Eliminate Guesswork – At $79.95
You Can't Afford To Be Without One!

DATA ARCHITECTS, INC.

460 Totten Pond Road
Waltham, Mass. 02154
(617) 890-7730

For Sale or Lease
Burroughs B-500 Financial Computer System
Burroughs Peripherals
Disk - Tape - Printers
Cardreaders
Call or write:
Don Mlsuda, President
Joe Codner, Sales Manager

DATA SYSTEMS, INC.

25 West McDowell
Phoenix, Arizona 85003
(602) 252-3474

Reducing Computer Users
Hardware Costs Since 1967

"DATA SYSTEMS, INC.
25 WEST McDOWELL
PHOENIX, ARIZONA 85001
BUY - SELL - LEASE
BURROUGHS - B-500 B-3500
B-2700 B-3700 B-4700 Systems
I.B.M. 360-370 Systems
CONTACT:
Donald Misuda, President
Joe Codner
Phoenix, Arizona (602) 252-3474
Larry Lyon
Denver, Colorado (303) 795-0112
Vern Lyon
El Paso, Texas (915) 532-3651

---

(1) IBM 370/125 MODEL G2 128K

with 5213 Console Printer for sublease.
Contact Warren Stillwell at West Chemical Products
(212) 784-2424 ext. 260

SUPER SALE!! IMMEDIATE DELIVERY!!

EXTENSION MEMORIES FOR SALE/LEASE

System 3
Model 10

System 360
Model 22,25,30,40, 44, 50, 65, 67

System 370
Model 155, 165

Univac
Model 1108, 494

Available through the following Sales Offices:
Atlanta 404/455-0516
Chicago 312/437-4116
Dallas 214/961-3195
Denver 303/753-9011
Los Angeles 213/972-0484
Minneapolis 612/938-8811
New York 516/273-8506
Philadelphia 215/643-7512

FABRITEK INC.
5901 So. County Rd. 18
Minneapolis, Minn. 55436

TIME FOR SALE

---

new york

Thomas National, Inc.

1775 Broadway, N.Y.C.

370/158 DATACENTER

OS-VS – RJE
And Other Communications
Automated Photo Composition

DOS Emulation
3330's and 2314's

Systems and Programming Support

Data Entry Services

Convenient 57th St. Location
Open 24 Hours Per Day
Call (212) 765-8500

---

new york

370/158

VS2-HASP/RJE, TSO
DOS Emulation
Disks-(18) 3330, (3) 2319
Tapes-(16) 3420 mod. 7
Printers-(5) 1403, (1) 3211
Excellent Technical Support
Very attractive rates on all shifts
Contact: Stu Karlavsky
(212) 644-3030
Datamor
132 West 31 St.
New York, N.Y. 10001

I.B.M. - 360-30

All Shifts 65K, 4-2401 MOD-2, 3-2311, 1403-N1, 2540, 1401 Compatibility
From $35.00/Hour
Restaurant Associates Ind.
1540 Broadway bet. 45 & 46th St.
New York, New York 10036
Contact:
Al Palmo at (212) 974-4066
Elliott Musikoff at (212) 974-4967

---

illinois

IBM 360/370 USERS
COMPUTER TIME AVAILABLE

370/158
3 meg, 3330 (3Bm), 2314 (16m), 12 3420-5 d.d. tape OS/VS2, RJE, TSO, ATS, DOS emul.
24 Hours – 7 Days

370/155
2 meg, 3330 (16m), 2314 (6m), 10 3420-5 d.d tape

370/135
240K, 3330 (4m), 2314 (8m), 6 3420-5 d.d. tape

360/50
512K, 2314 (4m), 8 2402-6 d.d. tapes

FOR FURTHER INFORMATION
JIM LaMANTIA
(312)346-1331

Computape
200 N. Michigan Avenue
Chicago, Ill. 60601
Largest Computer Time Sales Co.

---

massachusetts

COMPUTER RENTAL TIME

•360/50•
(2) 1100 LPM Printers
UCS Feature
(8) 2314, 512K
(1) 7trk Tape
(6) 9 trk Tapes

•360/30•
1200 LPM Printer
UCS Feature
(6) 2314, 196K
(4) 9trk Tapes

•Honeywell 6050•
T/S, Batch, Remote Batch
(1) 1600 LPM Printer
(1) 900 LPM Printer
(8) DS191 Drives, 256K
(2) 9trk Tapes
(1) 7trk Tapes

Complete data processing services including keypunching, programming, and systems analysis.
Thrift-Line applications such as payroll, accounts payable, accounts receivable and general ledger.

Data Processing Associates

time for sale

new jersey

I.B.M.-360'S

All shifts available on 4 - 360 systems with all features; 1 ea. 2311's, 2402's - 800 BPI, 1 ea. 2314, 2 ea. 2540's, 2 ea. 2401's, 1 ea. 2821, 1 ea. 1403's - N1, 2540's, 2703 with ASYM & BISYNC Port.
Prices start at $35.00 per hour. We also offer complete Batch and Tele-processing services. Configuration can be modified to accomodate any 360 computer user. We have on site CE's.

UCS Computer Centers
Route 50
Dover, N.J. 07805

Contact Bill Kersey at (201) 361-4800
or
Joe Kelly at (201) 361-8501

SOFTWARE FOR SALE

software for sale

STRUCTURED MODIFIER

IMPROVES PROGRAMMER PRODUCTIVITY BY 25%

Today's DP Managers are interested in the development of systems that "not only work" but are also easily maintained and well documented. MODIFIER is the answer.
MODIFILE offers you the following benefits:

- Speeds up creation of modular and structured Cobol programs.
- Simplifies debugging, maintenance.
- Assures program completeness.
- Improves quality control and documentation.
- Is machine independent and has been installed on IBM, NCR, Honeywell, Univac, Burroughs and other systems.

EXCLUSIVE FEATURES:

MODIFILE solves your most complex problems and aids you greatly in accomplishing this with a "top-down" structured programming system.

- File-matching and sequence checking of as many as six files with low sequence detection.
- Standardized mainline logic which generates source code for both sequential and indexed sequential processing.
- Control break detection of one to ten control levels.
- Automatic exit to end-of-job routine.
- Choice of four 'copy' statements with exits to standard paragraph names.

Write for brochure and sample program.

DE Computer Group

software for sale

PDP-11/45 SOFTWARE WANTED

Will buy or lease Data Base/Inquiry, Graphics, PERT, Statistical or other packages. Also desire system enhancements and IBM conversion or interface software. Principals only.

Mr. Glenn Bratcher
3286 Lothian Road
Fairfax, Virginia 22030

MMS
Accounts Payable-II
Keeps The Well From Going Dry!

Exclusive features:

- Data base design — all COBOL
- Complete vendor financial history
- Cash commitments by date in detail and summary
- Duplicate vendor invoice control
- Flexible voucher line control

Other financial systems:
Accounts Receivable
General Ledger
Payroll

SOFTWARE INTERNATIONAL
Elm Square, Andover, Ms. 0810
(617) 475-5040

software for sale

RE-CALL

A $2,500 retrieval report system for IBM 360/370 systems that provides features available only on systems selling for many times the price.

60 Day Free Trial
Call or Write
For Literature

DATA-MAN LTD.
Box 9234 Bow Valley Square II
Calgary, Canada T2P 2W4
(403) 266-6358

SERVICE CENTERS ACCOUNTING FIRMS RPG II

SOL LIGHT SOFTWARE FOR YOUR CLIENT'S NEEDS

PAYROLL
GENERAL LEDGER
ACCOUNTS PAYABLE
INVENTORY
ACCOUNTS RECEIVABLE

software for sale

SYSTEM/3 RPG II SOFTWARE FOR SALE
Thoroughly Documented
Multicompany Systems
General ledger, accounts receivable, inventory, payroll, utility billing.
DOCUMENTATION AIDS AND UTILITY PROGRAMS
Letter printing, line graphs, sequence/reproduce, System/3 run sheet printing.
General Computer Software

P.O. Box 1533
West Monroe, La. 71291
318-388-2236

DUAL TAPE SOURCE PROGRAMS into CYBER-TAPES DISK-UCL AUTOSAVE/ALL

TAPE DISK PROGRAMS into ANY DISK-UCL EXPERT QUICKLY, EASILY

QUAD Corporation
851 Dell Avenue, Highland Park, Illinois 60035 Tel. 312-433-1200

TOPS... ON THE BOTTOM LINE

Why are the ACCOUNTING IV financial applications systems tops? Because they combine tight controls, ease of installation and operation, and economy. Call or write today for details, including schedule of our next seminar in your city.

ACCOUNTING IV
General Ledger and Financial Reporting
Accounts Payable
Accounts Receivable

Informatics Inc 65 Route 4 River Edge, N.J. 07661 (201) 488-2100

The World's Largest in Software Products

McCORMACK & DODGE CORPORATION

HAS DEVELOPED MARKETED MAINTAINED

Accounting-oriented software products over the past five years.
Over 400 companies in the U.S. are using one or more of the following:

Fixed Asset Analysis & Accounting System
Accounts Receivable System
Investment Analysis System
Accounts Payable System

McCORMACK & DODGE CORPORATION

381 Elliot St.
Newton Upper Falls,
Mass. 02164
(617) 965-3750

Weather the Stormy Seventies with MMS GENERAL LEDGER

- Maximizes Internal Control
- Strengthens Cash Management
- Provides Most Reliable Forecasting

Other Financial Systems:
Accounts Receivable
Accounts Payable
Payroll/Personnel

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01801
(617) 475-5040

If you haven't talked to UCC about financial software, you aren't ready to buy.

The UCC General Ledger/Financial Control System. The most complete system of its type, it features:

- Full general ledger accounting
- Flexible responsibility reporting
- Comprehensive budgeting and cost allocation
- User-oriented report writer

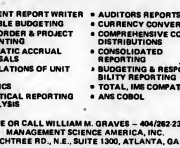
UCC FCS generates over 100 standard reports. Proven performance in over 150 installations. Call Richard Streller at (214) 637-5010.

UCC
UNIVERSITY COMPUTING COMPANY
7200 Stemmons Freeway P. O. Box 47911 Dallas, Texas 75247
A Wyly Company

Sell! Sell! Buy!

Buyers meet sellers in *Computerworld* Classifieds.

MSA GENERAL LEDGER



THE WINNER!

Over 250 businessmen like you use our system making it the most widely used system in the country. They didn't buy it because of any sales gimmick or fancy ad, but simply because it is the best commercial and manufacturing sytem available. Its key features are:

- EFFICIENT REPORT WRITER
- VARIABLE BUDGETING
- WORK ORDER & PROJECT ACCOUNTING
- AUTOMATIC ACCRUAL REVERSALS
- CALCULATIONS OF UNIT COSTS
- GRAPHICS
- STATISTICAL REPORTING & ANALYSIS
- AUDITORS REPORTS
- CURRENCY CONVERSION
- COMPREHENSIVE COST DISTRIBUTIONS
- CONSOLIDATED REPORTING
- BUDGETING & RESPONSIBILITY REPORTING
- TOTAL, IMS COMPATIBILITY
- ANS COBOL

WRITE OR CALL WILLIAM M. GRAVES — 404/262-2376
MANAGEMENT SCIENCE AMERICA, INC.
3445 PEACHTREE RD., N.E., SUITE 1300, ATLANTA, GA. 30326

NEW YORK 201/871-4700 **CHICAGO** 312/323-6840 **LOS ANGELES** 213/475-9726 **HOUSTON** (713) 527-0806

In Three Months

Two Time-Sharing Firms Up Revenues

Two time-sharing firms reported increased revenues for the various periods ended June 30. Tymshare, Inc.'s earnings for the second quarter and six months improved while Comshare, Inc. showed reduced earnings, despite more than a 100% rise in operating income for both the fourth quarter and year.

Tymshare's second-quarter revenues rose 23% to nearly $14 million compared with $11.4 million in the year-ago period.

Earnings totaled $1.1 million or 30 cents a share compared with $791,154 or 21 cents a share in the year-ago period.

During the six months, Tymshare's revenues rose to nearly $28 million compared with $22.6 million in the same period last year while earnings rose to $2.3 million or 61 cents a share compared with $1.6 million or 42 cents a share in the 1974 half year.

The figures for 1974 were restated to reflect the acquisition of United Data Centers, Inc.

At Comshare, revenues for 1975 rose 30% to $12.3 million compared with $9.5 million in 1974. Income from operations more than doubled to $1.5 million from $649,422 in 1974.

However, the firm earned nearly $1.5 million or $1.10 a share compared with $1.5 million or $1.13 a share last year.

The 1974 figures were restated to reflect a change in accounting to directly expense software and systems development costs as incurred.

During the fourth quarter, Comshare's revenues rose to $3.5 million compared with $2.5 million during the year-ago period.

Earnings dropped to $335,401 or 24 cents a share compared with $710,327 or 54 cents a share in the year-ago period.

CSC Quarter Net Increases 160%

EL SEGUNDO, Calif. – Computer Sciences Corp. (CSC) reported earnings growth and record revenues for the first quarter ended June 27.

Earnings for the quarter totaled $1.5 million or 11 cents a share, a 160% gain over the $585,000 or 4 cents a share recorded in the year-ago period.

Revenues for the quarter rose to $50.4 million, a gain of nearly 27% over the $39.7 million posted last year.

Both the contract services and Infonet sectors of the company's business contributed significantly to the profit improvement in the first quarter, William R. Hoover, chairman and president of CSC, said.

DPF Reports Earnings in the Black Despite Decline in '75 Revenues

HARTSDALE, N.Y. – Lessor DPF, Inc. wrote its 1975 earnings in black ink both on an operating basis and after special credits.

On an operating basis, the firm's income was $379,000 compared with a $4.8 million loss in 1974.

After tallying special credits, such as a $2.2 million gain on repurchase of debentures and a $2.3 million tax credit, earnings totaled $4.9 million or $1.19 a share compared with a loss of $3.4 million during 1974. During 1974, DPF wrote off $5.4 million on the core memory portion of its 360 equipment.

Revenues, however, declined to nearly $25.5 million from $31.5 million in the year ended May 31, 1974.

During the year, DPF applied $17 million in internally generated funds to reduce obligations and made final installment payments on 360 inventory.

Secured debt and bank loans were cut to $965,000 from $11.3 million a year ago; and convertible subordinated debentures stood at $21.6 million compared with $31.5 million on May 31, 1974.

The company authorized a budget of $5 million to be invested in expansion of its systems leasing business.

For the fourth quarter, revenues also declined to $5.4 million compared with $8.6 million in the year-ago period.

Earnings, including special credits, totaled $571,000 or 14 cents a share compared with a loss of $4.4 million in the same period last year.

Earnings Reports

TELEX
Three Months Ended June 30

	1975	1974
Shr Erned	$.19	$.02
Revenue	27,508,000	29,498,000
Tax Cred	538,000	.....
Earnings	1,972,000	165,000

TEKTRONIX
Year Ended May 31

	e1975	1974
Shr Erned	$3.04	$2.47
Revenue	336,645,000	271,428,000
Earnings	26,329,000	21,353,000

e-Reflects change to Lifo method of inventory valuation.

WANG LABORATORIES
Year Ended June 30

	1975	1974
Shr Erned	$.80	$1.20
Revenue	75,828,000	53,877,000
Earnings	3,250,000	4,889,000
3 Mo Shr	.30	.46
Revenue	24,893,000	20,026,000
Earnings	1,470,000	1,883,000

GRAHAM MAGNETICS
Year Ended June 30

	1975	1974
Shr Erned	$1.33	$1.46
Revenue	15,793,000	15,289,000
Earnings	1,248,611	1,368,275

COMPUTER TRANSCEIVER SYSTEMS
Year Ended Feb. 28

	1975	e1974
Shr Erned	$.58	$.53
Revenue	4,381,354	3,981,732
Tax Cred	245,700	224,500
Earnings	527,485	481,094

e-Restated.

WANGCO
Three Months Ended June 30

	1975	1974
Shr Erned	$.15	$.40
Revenue	5,220,220	4,949,879
Earnings	171,035	434,096
9 Mo Shr	1.12	1.12
Revenue	14,300,999	12,800,701
Earnings	495,288	1,227,349

BUNKER RAMO
Three Months Ended June 30

	1975	e1974
Shr Erned	$.14	$1.21
Revenue	$75,444,000	82,380,000
Earnings	(252,000)	1,749,000
6 Mo Shr	.02	.52
Revenue	148,189,000	159,303,000
Earnings	(1,170,000)	4,290,000

e-Restated.

AMPEX
Three Months Ended Aug. 2

	1975	e1974
Shr Erned	$.14	$1.21
Revenue	63,555,000	61,342,000
Disc Op	.....	(15,000)
Tax Cred	607,000	5,510,000
Earnings	1,559,000	13,125,000

e-Restated for discontinued operations.

CENTRONICS DATA COMPUTER
Year Ended June 30

	1975	1974
Shr Erned	$1.52	$1.85
Revenue	41,500,000	41,500,000
Earnings	7,258,000	7,931,000
3 Mo Shr	.35	.47
Revenue	10,500,000	12,100,000
Earnings	1,675,000	2,254,000

BOLT, BERANEK & NEWMAN
Year Ended June 30

	1975	1974
Shr Erned	$1.03	$1.02
Revenue	28,688,000	22,979,000
Earnings	41,271,100	1,259,500
3 Mo Shr	.14	.30
Revenue	8,049,500	8,399,400
Earnings	176,300	370,900

e-Includes gain of $308,300 from exchange of nonexclusive license.

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 17, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

E		★----------PRICE----------★			★----------PRICE----------★			★----------PRICE----------★		
C		1975	CLOSE	WEEK	1975	CLOSE	WEEK	1975	CLOSE	WEEK
H		RANGE	PRICE	NET	RANGE	SEP.17	NET	RANGE	SEP.17	NET
L		111	1975	CHNGE	111	1975	CHNGE	111	1975	CHNGE

COMPUTER SYSTEMS

N	PURPOUSHS CORP	62-109	84 3/8	-2 5/8	+3.0
C	COMPUTER AUTOMATION	2- 10	8 7/8	+ 1/4	+2.9
A	CONTROL DATA CORP	11- 23	15 1/8	- 5/8	-3.9
N	DATA GENERAL CORP	10- 30	26 1/4	- 7/8	-3.2
O	DATAPOINT CORP	6- 26	18 1/2	- 3/4	-3.8
O	DIGITAL COMP CONTROLS	1- 4	3 1/4	+ 1/4	+8.3
N	DIGITAL EQUIPMENT	46-122	108 1/2	-3	-2.6
A	ELECTRONIC ASSOC.	2- 3	2 3/8	- 1/8	-5.0
A	ELECTRONIC ENGINEER.	5- 10	8 1/4	- 1/4	-2.9
A	PDP-10 CO	23- 42	25 3/8	- 7/8	-3.3
O	GENERAL AUTOMATICS	6- 14	6 3/4	- 3/8	-5.2
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	48-120	91	+ 7/8	+0.9
N	HONEYWELL INC	22- 40	27 5/8	+1 7/8	+7.3
N	IBM	158-226	179 3/4	+ 3/4	+0.4
O	INCOTERM	5- 10	7 7/8	+ 1/4	+3.3
C	MICRODATA CORP	2- 6	4	- 1/2	-9.0
C	MODULAR COMPUTER SYS	1- 4	2 7/8	- 1/2	-14.8
N	NCR	15- 39	25 3/4	- 1/4	-0.7
O	PRIME COMPUTER INC	2- 5	3 1/8	- 1/4	-5.3
N	PERKIN-ELMER	16- 30	23 1/8	- 7/8	-3.6
N	RAYTHEON CO	24- 59	48 1/2	- 1/2	-0.4
N	SINGER COMPANY	10- 17	11 3/4	+ 3/4	+6.8
N	SPERRY RAND	26- 49	35 3/4	- 1/2	-1.4
A	SYSTEMS ENG. LABS	1- 5	3 1/8	0	0.0
O	ULTIMATE SYSTEMS INC	1- 6	3 1/8	0	0.0
N	VARIAN ASSOCIATES	7- 18	12 7/8	- 5/8	-4.6
N	WANG LABS.	9- 54	9 3/8	+2 1/8	+29.3
N	XEROX CORP	51- 86	53	+ 3/4	+1.4

LEASING COMPANIES

C	COMDISCO INC	1- 5	3 3/8	+ 1/8	+3.8
A	COMMUNIC GROUP CORP	2- 6	2 3/4	- 1/8	-4.3
B	COMPUTER INVSTRS GRP	1- 2	1/2	- 1/8	-20.0
A	DATRONIC RENTAL	1- 3	1 1/2	0	0.0
O	DCL INC	1- 1	1/2	0	0.0
O	DPF INC	6- 8	4 3/4	- 1/8	-2.5
O	PDP RESOURCES	1- 2	1	0	0.0
O	GRANITE MGT	5- 9	6 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 3	2 1/2	- 3/8	-13.0
A	ITEL	9- 17	9	- 1/4	-2.7
N	LEASCO CORP	4- 8	5 1/2	0	0.0
N	LEASING CORP	4- 8	5	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
C	MPG INC	1- 3	1 5/8	- 3/4	-31.5
A	MERCER TCP CORP	2- 7	5	+ 1/4	+5.2
A	ROCKWOOD COMPUTER	1- 3	1 7/8	0	0.0
N	U.S. LEASING	7- 14	7	- 1/2	-6.6

EXCHG N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER.
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

C	ADVANCED COMP TECH	1- 1	1	+ 1/8	+14.2
N	APPLIED DATA RES.	1- 10	7 5/8	- 1/8	-1.6
N	AUTOMATIC DATA PROC	29- 65	49 3/4	- 5 3/4	-11.1
N	BRANDON APPLIED SYST	1- 3	1 1/2	0	0.0
O	CENTRAL DATA SYSTEMS	3- 7	6 5/8	0	0.0
O	COMPUTER DIMENSIONS	2- 5	3 3/4	- 1/4	-6.2
C	COMP ELECTRON SYSTMS	3- 6	5 1/4	- 1/4	-4.5
O	COMPUTER HORIZONS	1- 1	1/2	0	0.0
O	COMPUTER METHODS	1- 3	2 5/8	+ 1/4	+10.5
O	COMPUTER SERVICES	4- 8	5	- 1/4	-4.8
O	COMPUTER TASK GROUP	2- 6	5	0	0.0
O	COMPUTER USAGE	2- 5	2 1/8	- 1/8	-5.5
O	COMSHARE	1- 4	2 3/8	- 1/8	-5.0
O	DATATAB	1- 2	1 3/8	- 1/4	-15.3
O	ELECT COMP PROG	1- 1	1/2	0	0.0
N	ELECTRONIC DATA SYS.	12- 28	15 1/2	0	0.0
C	INCREMENTAL INC	1- 2	1 1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	5/8	- 1/8	-16.6
C	MIAMI ASSOCIATES	2- 3	2	- 1/8	-5.8
O	MYDATA CORP	2- 3	2 1/8	0	0.0
C	LOGICON	3- 5	3 3/4	0	0.0
A	MANAGEMENT DATA	1- 3	1 7/8	0	0.0
C	NATIONAL CSS INC	6- 14	10 5/8	-1 7/8	-15.0
O	NATIONAL COMPUTER CO	1- 1	1/2	0	0.0
A	ON LINE SYSTEMS INC	0-17	11	- 3/4	-6.3
O	PLANNING RESEARCH	0- 4	3 3/4	+ 1/4	+7.1
C	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	PYRAMID DATA	1- 3	1 3/8	0	0.0
O	REYNOLDS & REYNOLDS	10- 24	11	- 1/2	-4.3
O	SCIENTIFIC COMPUTERS	1- 1	1/2	0	0.0
C	SIMULATED COMPUTER	1- 1	1 1/8	+ 1/4	+28.5
O	SYSTEMATICS INC	2- 4	3 1/8	+ 1/8	+4.1
O	UPS SYSTEMS	2- 4	3 3/8	+ 1/8	+3.8
N	WYLY CORP	7- 14	7	- 1/8	-1.7

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	4- 9	7 3/4	+ 5/8	+8.0
A	ADVANCED SYS	1- 7	4 3/4	+ 1/4	+5.5
O	AMNEP CORP	1- 7	4 7/8	- 3/8	-7.1
O	AMPEX CORP-ZALOPSK A	3- 7	5 1/8	+ 1/8	+2.4
O	BEEHIVE MEDICAL ELEC	1- 5	3 1/8	+ 1/4	+8.6
O	BOLT,BERANEK & NEW	1- 5	3 1/4	+ 1/4	+8.3
O	BUNKER-RAMO	4- 8	4 3/4	+ 1/4	+5.5
A	CALCOMP	1- 7	3 3/4	0	0.0
C	CAMPRIDGE MEMORIES	3- 5	2 3/4	- 3/4	-21.4
N	CENTRONICS DATA COMP	5- 25	14 5/8	- 3/8	-2.5
O	CODEX CORP	15- 38	30 3/4	-2 1/4	-6.8
O	CROMEMCO INC	2- 4	3	- 1/4	-25.0
C	COMPUTER COMMUN.	1- 2	1	0	0.0
C	COMPUTER CONSOLES	1- 3	1 7/8	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 3/4	+ 1/8	+7.6
C	COMPUTER MACHINERY	1- 2	1 1/4	+ 1/8	+10.0
C	COMPUTER TRANSCEIVER	2- 3	1 1/8	0	0.0
O	CONRAC	6- 12	8	- 1/4	-3.0
A	CONRAC CORP	12- 23	15 3/4	-1 3/4	-10.0
O	DATA ACCESS SYSTEMS	1- 3	2	3	0.0
O	DATA 100	5- 16	8 5/8	- 3/4	-8.0
A	DATA PRODUCTS CORP	2- 6	3 1/4	- 3/8	-10.3
O	DATA TECHNOLOGY	1- 3	1 5/8	0	0.0
O	DATAMEC INC	1- 2	1 1/8	0	0.0
O	DECISION DATA COMPUT	1- 2	1 1/8	- 1/8	-7.7
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIGAN CONTROLS	1- 1	1/2	0	0.0
N	ELECTRONIC M & N	2- 3	3 1/4	+ 1/4	+8.3
O	FABRI-TEK	1- 1	7/8	- 1/8	-13.3
O	GENERAL COMPUTER SYS	1- 2	1 1/8	- 1/8	-10.0
N	HAZELTINE CORP	3- 6	4 1/8	+ 1/4	+6.4
N	MARRIS CORP	18- 28	20 3/4	-1 1/4	-5.7
O	INCOTERM CORP	3- 12	9 1/8	- 3/4	-7.6
O	INFORMA INC	2- 5	2 1/2	- 1/8	-4.7
C	INFORMATIONAL INTL INC	3- 14	5 1/2	+ 1/8	+11.0
A	LUNDY ELECTRONICS	2- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 2	1	0	0.0
A	MILGO ELECTRONICS	8- 24	15 3/8	- 3/8	-2.3
N	MOHAWK DATA SCI.	1- 3	1 3/4	- 1/4	-7.6
C	OPTICAL SCANNING	1- 3	3	3	0.0
O	RUMO INC	1- 2	1 1/8	- 1/8	-10.0
C	REPTEC CORP	2- 8	4 1/2	- 3/4	-14.2
A	POTTER INSTRUMENT	2- 5	3 1/4	0	0.0
C	PRECISION INST.	1- 1	3/4	0	0.0
O	QUANTUM CORP	2- 6	5	- 1/2	-9.1
A	RECOGNITION EQUIP	2- 9	5 1/4	- 3/4	-12.5
C	SANDERS ASSOCIATES	5- 11	6 1/4	-1 1/4	-16.6
O	SCAN DATA	1- 3	1 3/4	0	0.0
O	STORAGE TECHNOLOGY	4- 13	5 1/2	- 3/4	-9.1
O	SYCOR INC	5- 15	12 1/2	-1	-7.4
N	TRW	31- 57	56 3/8	- 1/8	-0.2
O	TALLY CORP.	1- 5	3 1/4	+ 1/8	+4.0
O	TEC INC	1- 1	1	0	0.0
N	TEKTRONIX INC	18- 41	33	-2 1/4	-6.4
O	TELEX	3- 6	4	- 1/4	-5.8
O	WANGCO INC	4- 9	9 5/8	- 3/8	-3.7
O	WILTEK INC	1- 4	2 1/2	0	0.0

SUPPLIES & ACCESSORIES

C	BALTIMORE RUS FORMS	4- 9	4 3/4	0	0.0
A	BARRY WRIGHT	5- 14	7 1/4	- 1/4	-3.3
C	CYBERNETICS INC	1- 1	1/2	0	0.0
N	DATA 3M CO	21- 52	32 1/2	-1 3/4	-5.1
O	DUBLER PRODUCTS INC	12- 23	16	- 1/8	-0.7
N	ENNIS BUS. FORMS	5- 7	5	- 1/8	-2.4
O	GRAHAM MAGNETICS	5- 10	8 1/4	- 1/4	-2.9
C	GRAPHIC CONTROLS	9- 21	11 3/4	+ 1/4	+2.1
N	3M COMPANY	43- 68	49 5/8	-1 5/8	-3.2
N	MOPEC CPM LTD	39- 51	43 1/4	- 1/4	-0.5
N	NASHUA CORP	11- 22	11 1/8	- 1/8	-1.1
N	STANDARD REGISTER	11- 20	15 1/2	- 1/8	-0.8
O	TAB PRODUCTS CO	4- 8	4	0	0.0
N	UARCO	17- 24	19 1/4	+ 1/4	+1.3
C	YANTER GRAPHICS CORP	4- 7	4 1/2	+ 1/4	+5.8
O	ZEBRA MAGNETICS	1- 2	1	0	0.0
N	WALLACE BUS FORMS	15- 25	16 1/8	- 3/8	-2.2

GENERAL LEDGER-1976

NOW AVAILABLE AT

THE FINANCIAL SOFTWARE COMPANY

The 295 users of the MSA General Ledger/Financial Information and Control System are soon to receive the 1976 Edition of the System, complete with these new features: Data Base Independence; On-Line Data Entry and Inquiry; a "Task Manager" for operations simplification; Data Base Security Protection; and a Single Pass Report Writer (Custom Reporting II).

This updated Edition of the leading General Ledger Software System is available to you now. Of all its features, perhaps the best is the fact that once it's installed, you'll never again have to worry about conversion, because MSA keeps you up to date over the years with continuing enhancements.

Please send information on GENERAL LEDGER – 1976

Name_____

Company_____

Address_____

City_____ State_____ Zip_____

Send to: Dennis Vohs, Vice President
Management Science America, Inc.
3445 Peachtree Road, N.E.
Suite 1300
Atlanta, Georgia 30326

During 1974 and 1975, we've invested over $850,000.00 in supporting this System. Send now for the 1976 descriptive manual at no cost or obligation, or call Dennis Vohs, Vice President, MSA, at Area Code 404, 262-2376, for more information.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | time for sale

COMDISCO
The world's largest IBM computer dealer

selling 370/155, 370/165, 370/158

leasing 370/145 I2, 370/158 JI

buying 370/135, 370/145

WRITE
CALL
312 297 3640
East 203 359 4814
West 415 944 0323
MEMBER COMPUTER DEALERS ASSOCIATION

Price/Performance Winner 145

Win the price/performance battle with an IBM 145. Your savings are $100,000 to $300,000 when you buy your 145 from CIS.

PHONE 315 474-5776
TELEX 93-7435

Mos.	Date Available	CIS System Number
	NOW	165
		110
		162
		272
		285

Easy Terms Available

CONTINENTAL INFORMATION SYSTEMS
CIS CORPORATION

MIDTOWN PLAZA SYRACUSE NEW YORK 13210
CIS EUROPE SA 80 CHAUSSEE DE CHARLEROI 1060 BRUSSELS
BRUSSELS TELEX 26025 MEMBER CDA

Opportunities Knock Here.

Computerworld Classifieds could hold the key to your next office.

WANTED TO BUY

2 2830 Tape Control Units Model 1
7 2401 Tape Drives Model 3

As an option, the above equipment can be formatted in practically any combination of 2401's, 2402's and 2403's. This equipment is required for delivery no later than November 15, 1975 and must qualify for IBM Maintenance Agreement.

Direct written offers to M. Meadows, Laclede Gas Co., 720 Olive St. St. Louis, Mo. 63101 (314) 231-3800, Ext. 272

IN CANADA

We specialize in 360/20, 360/30 & up System 3, 370 Series We buy your excess IBM Equipment CMI Company P.O. Box 893 Windsor, Ontario N9A 6P2 519 256-8910

Want to buy from principal for delivery in Jan. 370/145 I2 or HG2.

CALL:

(501) 664-7483

Needs configuration with detailed specs, serial no, price and date available.

FOR LEASE

2314 CONTROL UNIT
9 SPINDLES
UNDER IBM MAINT.

USERS INCORPORATED
1703 East Joppa Rd, Baltimore, Md. 21234
(301) 661-7200
Attn: H. Bullion

COMPUTER USERS:

LINEALERT
Power Monitor
Positively Identifies

- Outages
- Brownouts
- Transients
- 120V 60Hz Operation

Eliminate Guesswork – At $79.95
You Can't Afford To Be Without One!

DATA ARCHITECTS, INC.
460 Totten Pond Road
Waltham, Mass 02154
(617) 890-7730

For Sale or Lease
Burroughs B 500 Financial Computer System
Burroughs Peripherals
Disk - Tape - Printers
Cardreaders
Call or write:
Don Mlacker, President
Joa Codner, Sales Manager

DATA SYSTEMS, INC.
25 West McDowell
Phoenix, Arizona 85003
(602) 252-3474

Reducing Computer Users
Hardware Costs Since 1967
"DATA SYSTEMS, INC.
25 WEST McDOWELL
PHOENIX, ARIZONA 85001
BUY SELL LEASE
BURROUGHS B 500 B 3500
B 2700 B 3700 B 4700 Systems
I.B.M. 360 370 Systems
CONTACT:
Donald Mlacker, President
Joe Codner
Phoenix, Arizona (602) 252-3474
Larry Lyon
Denver, Colorado (303) 795-9112
Van Evans
El Paso, Texas (915) 532-3651

(1) IBM 370/125 MODEL G2 128K

with 5213 Console Printer for sublease.
Contact Warren Stillwell at West Chemical Products
(212) 784-2424 ext. 260

SUPER SALE!! IMMEDIATE DELIVERY!!

EXTENSION MEMORIES FOR SALE/LEASE

System 3 Model 10

System 360 Model 22,25,30,40, 44, 50, 65, 67

System 370 Model 155, 165

Univac Model 1108, 494

Available through the following Sales Offices:

Atlanta 404/455-0515
Chicago 312/437-4116
Dallas 214/661-3155
Denver 303/753-0631
Los Angeles 213/973-0484
Minneapolis 612/935-8811
New York 516/273-8505
Philadelphia 215/643-7512

FABRI-TEK INC
5901 So. County Rd. 18
Minneapolis, Minn. 55436

TIME FOR SALE

new york

Thomas National Inc

1775 Broadway, N.Y.C.

370/158 DATACENTER

OS-VS – RJE
And Other Communications
Automated Photo Composition

DOS Emulation
3330's and 2314's

Systems and Programming Support

Data Entry Services

Convenient 57th St. Location
Open 24 Hours Per Day
Call (212) 765-8500

new york

370/158

VS2-HASP/RJE, TSO
DOS Emulation
Disks-(18) 3330, (3) 2319
Tapes-(16) 3420 mod. 7
Printers-(5) 1403, (1) 3211
Excellent Technical Support
Very attractive rates on all shifts
Contact: Stu Kerievsky (212) 564-3030
Datamor
132 West 31 St.
New York, N.Y. 10001

I.B.M. - 360-30

All Shifts 65K, 4-2401 MOD-2, 3-2311, 1403-N1, 2540, 1401 Compatibility
From $35.00/Hour
Restaurant Associates Ind.
1540 Broadway bet. 45 & 46th St.
New York, New York 10036
Contact
Al Palmo at (212) 974-4965
Elliott Musikoff at (212) 974-4567

illinois

IBM 360/370 USERS
COMPUTER TIME AVAILABLE

370/158
3 meg, 3330 (12m), 2314 (16m), 12 3420-5 d.d. tape
OS/VS2, RJE, TSO, ATS, DOS emul.
24 Hours – 7 Days

370/155
2 meg, 3330 (16m), 2314 (8m), 10 3420-5 d.d tape

370/135
240K, 3330 (4m), 2314 (8m), 6 3420-5 d.d. tape

360/50
512K, 2314 (8m), 8 2402-6 d.d. tapes

FOR FURTHER INFORMATION
JIM LaMANTIA
(312) 346-1331

Computer Companies
200 N. Michigan Avenue
Chicago, Ill. 60601
Largest Computer Time Sales Co.

massachusetts

COMPUTER RENTAL TIME

+360/50+
(2) 1100 LPM Printers
UCS Feature
(6) 2314, 512K
(1) 7trk Tape
(6) 9trk Tapes

+360/30+
1100 LPM Printer
UCS Feature
(8) 2314, 128K
(4) 9trk Tapes

+Honeywell 6050+
T/S, Batch, Remote Batch
(1) 1200 LPM Printer
(1) 600 LPM Printer
(8) DS191 Drives, 192K
(5) 9trk Tapes
(1) 7trk Tapes

Complete data processing services including keypunching, programming, and systems analysis
Thrift-Line applications such as payroll, accounts payable, accounts receivable and general ledger.

Contact Paul Brighton (617) 272-7721
Programs & Analysis Inc

time for sale

new jersey

I.B.M.-360'S

All shifts available on 4 - 360 computers with all features, 2314's, 2311's, 2402's, 800 BPI 9 TRK., 2402's, 1600 BPI 7 TRK., 2401's, 1600 BPI 9 TRK., 1403's, N1, 2540's, 2703 with ASYN & BISYNC Progs.

Prices start at $35.00 per hour. We also have Software Packages & Tele-processing services. Configuration can be modified to accomodate any 360 computer user. We have on site CE's.

UCS Computer Centers
Route 80
Dover, N.J. 07885

Contact Bill Kersey at
(201) 361-8600

Joe Kelly at
(201) 361-9601

SOFTWARE FOR SALE

software for sale

STRUCTURED DESIGN, PROGRAMMING

MODIFILE

IMPROVES PROGRAMMER PRODUCTIVITY BY 25%

Today's DP Managers are interested in the development of systems that "not only work" but are also easily maintained and well documented. MODIFILE is the answer!

MODIFILE offers you the following benefits

- **Speeds up creation of modular and structured Cobol programs.**
- **Simplifies debugging, maintenance.**
- **Assures program completeness.**
- **Improves quality control and documentation.**
- **Is machine independent and has been installed on IBM, NCR, Honeywell, Univac, Burroughs and other systems.**

EXCLUSIVE FEATURES.

MODIFILE solves your most complex problems and aids you greatly in accomplishing this with a top-down/ structured programming system.

- Line matching and sequence checking of as many as six files with low sequence detection.
- Standardized maximize logic which generates source code for both sequential and indexed-sequential processing.
- Control break detection of one to ten control items.
- Automatic exit to end of job routine.
- Choice of four copy statements with exits to standard paragraph names.

Write for brochure and sample program.

DE Computer Group
2022 SLIDELL STREET
ARLINGTON, VIRGINIA 22202
(804) 359-4439

software for sale

PDP-11/45 SOFTWARE WANTED

Will buy or lease Data Base/Inquiry, Graphics, PERT, Statistical or other packages. Also deliver system enhancements and IBM conversion or interface software. Principals only.

Mr. Glenn Bratcher
3286 Lothian Road
Fairfax, Virginia 22030

MMS Accounts Payable-II Keeps The Well From Going Dry!

- Includes features
- Checks/line design
- Complete vendor history all invoices
- Cash requirements by date or detail and summary
- Duplicate vendor name control
- Flexible 1 voucher/line control
- Short financial reports: Accounts Receivable General Ledger Payroll

SOFTWARE MANAGEMENT SYSTEMS, INC.
Elm Square, Andover, Ma. 01810
(617) 475-5040

software for sale

RE-CALL

A $2,500 retrieval report system for IBM 360/370 systems that provides features available only on systems selling for many times the price.

60 Day Free Trial
Call or Write
For Literature

DATA-MAN LTD.
Box 9234 Bow Valley Square II
Calgary, Canada T2P 2W4
(403) 266-6358

SERVICE CENTERS ACCOUNTING FIRMS RPG II

THE RIGHT SOFTWARE FOR YOUR CLIENT'S NEEDS

PAYROLL
GENERAL LEDGER
ACCOUNTS PAYABLE
INVENTORY
ACCOUNTS RECEIVABLE

Certified Software Products, Inc.

software for sale

SYSTEM/3 RPG II SOFTWARE FOR SALE
Thoroughly Documented
Multicompany Systems
General ledger, accounts receivable, inventory, payroll, utility billing
DOCUMENTATION AIDS AND UTILITY PROGRAMS.
Letter printing, line graphs, sen gun punch/reproduce, System/3 run sheet printing
Bancroft Computer Software

P.O. Box 1533
West Monroe, LA. 71291
318-388-2236

DEVELOPMENT SOURCE PROGRAMS INTO [illegible] COBOL AUTOMATICALLY!

TIME SHARE PROGRAMMING WITH AN OBJECT EXPERT IMMEDIATELY!

QUAD Corporation
[illegible]

Weather the Stormy Seventies with MMS GENERAL LEDGER

- Maximizes Internal Control
- Strengthens Cash Management
- Provides Most Reliable Forecasting

Other Financial Systems:
Accounts Receivable
Accounts Payable
Payroll/Personnel

SOFTWARE MANAGEMENT SYSTEMS, INC.
Elm Square, Andover, Mass. 01801
(617) 475-5040

TOPS... ON THE BOTTOM LINE

ACCOUNTING IV
General Ledger and Financial Reporting
Accounts Payable
Accounts Receivable

Why are the ACCOUNTING IV financial applications systems tops? Because they combine tight controls, ease of installation and operation, and economy. Call or write today for details, including our next seminar in your city.

informatics inc
21 Route 4
River Edge, N.J. 07661
(201) 488-2100

The World's Largest in Software Products

If you haven't talked to UCC about financial software, you aren't ready to buy.

The UCC General Ledger/Financial Control System. The most complete system of its type, it features:

- Full general ledger accounting
- Flexible responsibility reporting
- Comprehensive budgeting and cost allocation
- User-oriented report writer

UCC FCS generates over 100 standard reports. Proven performance in over 150 installations. Call Richard Streller at (214) 637-5010.

UCC
UNIVERSITY COMPUTING COMPANY
7200 Stemmons Freeway P.O. Box 47911 Dallas, Texas 75247
A Wyly Company

McCORMACK & DODGE CORPORATION

HAS DEVELOPED MARKETED MAINTAINED

Accounting-oriented software products over the past five years.
Over 400 companies in the U.S. are using one or more of the following:

Fixed Asset Analysis & Accounting System
Accounts Receivable System
Investment Analysis System
Accounts Payable System

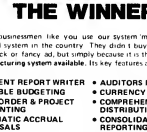
McCORMACK & DODGE CORPORATION

381 Elliot St.
Newton Upper Falls, Mass. 02165
(617) 965-3750

Sell! Sell! Buy!

Buyers meet sellers in *Computerworld* Classifieds.

MSA GENERAL LEDGER



THE WINNER!

Over 250 businessmen like you use our system making it the most widely used system in the country. They didn't buy it because of any sales gimmick or fancy ad, but simply because it is the best commercial and manufacturing system available. Its key features are:

- EFFICIENT REPORT WRITER
- VARIABLE BUDGETING
- WORK ORDER & PROJECT ACCOUNTING
- AUTOMATIC ACCRUAL REVERSALS
- CALCULATIONS OF UNIT COSTS
- GRAPHICS
- STATISTICAL REPORTING & ANALYSIS
- AUDITORS REPORTS
- CURRENCY CONVERSION
- COMPREHENSIVE COST DISTRIBUTIONS
- CONSOLIDATED REPORTING
- BUDGETING & RESPONSIBILITY REPORTING
- TOTAL, IMS COMPATIBILITY
- ANS COBOL

WRITE OR CALL WILLIAM M. GRAVES – 404/262-2376
MANAGEMENT SCIENCE AMERICA, INC.
3445 PEACHTREE RD., N.E., SUITE 1300, ATLANTA, GA. 30326

NEW YORK 201/871-4700 CHICAGO 312/323-5940 LOS ANGELES 213/475-9726 HOUSTON (713) 527-0806

In Three Months

Two Time-Sharing Firms Up Revenues

Two time-sharing firms reported increased revenues for the various periods ended June 30. Tymshare, Inc.'s earnings for the second quarter and six months improved while Comshare, Inc. showed reduced earnings, despite more than a 100% rise in operating income for both the fourth quarter and year.

Tymshare's second-quarter revenues rose 23% to nearly $14 million compared with $11.4 million in the year-ago period.

Earnings totaled $1.1 million or 30 cents a share compared with $791,154 or 21 cents a share in the year-ago period.

During the six months, Tymshare's revenues rose to nearly $28 million compared with $22.6 million in the same period last year while earnings rose to $2.3 million or 61 cents a share compared with $1.6 million or 42 cents a share in the 1974 half year.

The figures for 1974 were restated to reflect the acquisition of United Data Centers, Inc.

At Comshare, revenues for 1975 rose 30% to $12.2 million compared with $9.5 million in 1974. Income from operations more than doubled to $1.5 million from $649,422 in 1974.

However, the firm earned nearly $1.5 million or $1.10 a share compared with $1.5 million or $1.13 a share last year.

The 1974 figures were restated to reflect a change in accounting to directly expense software and systems development costs as incurred.

During the fourth quarter, Comshare's revenues rose to $3.5 million compared with $2.5 million during the year-ago period.

Earnings dropped to $335,401 or 24 cents a share compared with $710,327 or 54 cents a share in the year-ago period.

DPF Reports Earnings in the Black Despite Decline in '75 Revenues

HARTSDALE, N.Y. – Lessor DPF, Inc. wrote its 1975 earnings in black ink both on an operating basis and after special credits.

On an operating basis, the firm's income was $379,000 compared with a $4.8 million loss in 1974.

After tallying special credits, such as a $2.2 million gain on repurchase of debentures and a $2.3 million tax credit, earnings totaled $4.9 million or $1.19 a share compared with a loss of $3.4 million during 1974. During 1974, DPF wrote off $5.4 million on the core memory portion of its 360 equipment.

Revenues, however, declined to nearly $25.5 million from $31.5 million in the year ended May 31, 1974.

During the year, DPF applied $17 million in internally generated funds to reduce obligations and made final installment payments on 360 inventory.

Secured debt and bank loans were cut to $965,000 from $11.3 million a year ago, and convertible subordinated debentures stood at $21.6 million compared with $31.5 million on May 31, 1974.

The company authorized a budget of $5 million to be invested in expansion of its systems leasing business.

For the fourth quarter, revenues also declined to $5.4 million compared with $8.6 million in the year-ago period.

Earnings, including special credits, totaled $571,000 or 14 cents a share compared with a loss of $4.4 million in the same period last year.

CSC Quarter Net Increases 160%

EL SEGUNDO, Calif. – Computer Sciences Corp. (CSC) reported earnings growth and record revenues for the first quarter ended June 27.

Earnings for the quarter totaled $1.5 million or 11 cents a share, a 160% gain over the $585,000 or 4 cents a share recorded in the year-ago period.

Revenues for the quarter rose to $50.4 million, a gain of nearly 27% over the $39.7 million posted last year.

Both the contract services and Infonet sectors of the company's business contributed significantly to the profit improvement in the first quarter, William R. Hoover, chairman and president of CSC, said.

Earnings Reports

TELEX
Three Months Ended June 30

	1975	1974
Shr Ernd	8.19	8.02
Revenue	27,508,000	29,495,000
Tax Cred	635,000	
Earnings	1,972,000	165,000

TEKTRONIX
Year Ended May 31

	a1975	1974
Shr Ernd	$3.04	$2.47
Revenue	336,645,000	271,428,000
Earnings	26,329,000	21,353,000

a-Reflects change to Lifo method of inventory valuation.

WANG LABORATORIES
Year Ended June 30

	1975	1974
Shr Ernd	4.80	$1.20
Revenue	75,828,000	63,877,000
Earnings	3,255,000	4,469,000
3 Mo Shr	.36	.46
Revenue	24,893,000	20,026,000
Earnings	1,470,000	1,883,000

GRAHAM MAGNETICS
Year Ended June 30

	1975	1974
Shr Ernd	$1.33	$1.46
Revenue	15,793,000	15,289,000
Earnings	1,248,611	1,368,214

COMPUTER TRANSCEIVER SYSTEMS
Year Ended Feb. 28

	1975	a1974
Shr Ernd	$.58	$.53
Revenue	4,381,354	3,998,732
Tax Cred	246,700	224,500
Earnings	527,486	481,094

a-Restated.

WANGCO
Three Months Ended June 30

	1975	1974
Shr Ernd	$.16	$.40
Revenue	5,220,226	4,949,879
Earnings	171,035	434,096
9 Mo Shr	.47	1.12
Revenue	14,300,999	12,800,701
Earnings	495,288	1,227,349

BUNKER RAMO
Three Months Ended Aug. 2

	1975	a1974
Shr Ernd	$.19	
Revenue	$76,444,000	82,380,000
Earnings	(262,000)	1,745,000
6 Mo Shr	.52	.52
Revenue	148,189,000	159,303,000
Earnings	(1,170,000)	4,290,000

a-Restated.

AMPEX
Three Months Ended Aug. 2

	1975	a1974
Shr Ernd	$.14	$1.21
Revenue	63,655,000	61,342,000
Disc Op		115,000
Tax Cred	607,000	5,510,000
Earnings	1,559,000	13,125,000

a-Restated for discontinued operations.

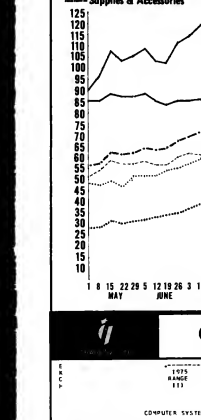
CENTRONICS DATA COMPUTER
Year Ended June 30

	1975	1974
Shr Ernd	$1.52	$1.65
Revenue	41,500,000	41,000,000
Earnings	7,258,000	7,931,000
3 Mo Shr	.35	.47
Revenue	10,500,000	12,100,000
Earnings	1,676,000	2,264,000

BOLT, BERANEK & NEWMAN
Year Ended June 30

	1975	1974
Shr Ernd	$1.03	$1.02
Revenue	28,688,000	22,079,000
Earnings	a1,271,000	1,269,600
3 Mo Shr	.14	.30
Revenue	8,049,500	6,399,400
Earnings	176,300	370,900

a-Includes gain of $308,300 from exchange of nonexclusive license.



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 17, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E		PRICE			WEEK	WEEK
N		1975	CLOSE	WEEK	%	%
C		RANGE	SEP 17	NET	CHGE	CHGE
H		113	1975	CHGE		
N	HURROUGHS CORP	62-109	84 3/8	-2 5/8	-3.0	
F	COMPUTER AUTOMATION	2- 10	5 7/8	+ 1/4	+2.4	
A	COMPUTER DATA CORP	1- 21	15 1/4	+ 1/4	+1.7	
N	DATA GENERAL CORP	10- 38	26 1/4	- 7/8	-3.2	
N	DIGITAL EQUIP	6- 24	19 1/2	- 3/4	-3.7	
A	DIGITAL SCAN CONTROL	1- 4	1 1/4	- 3/4	-23.0	
N	DIGITAL EQUIPMENT	46-127	108 1/2	-3	-2.7	
A	ELECTRONIC ASSOC	2- 8	4 1/4	- 1/4	-5.6	
A	ELECTRONIC ENGINEER.	5- 10	8 1/4	- 1/4	-2.9	
A	FONSPAR	23- 42	25 1/4	- 1/8	-0.5	
O	GENERAL AUTOMATIO	6- 14	6 3/4	- 3/8	-5.2	
A	GRI COMPUTER CORP	1- 2	1 1/8	0	0.0	
N	HEWLETT-PACKARD CO	18-120	91	+ 7/8	+0.9	
N	HONEYWELL INC	22- 90	27 5/8	- 1 7/8	-6.3	
N	IBM	158-224	179 3/4	+ 3/4	+0.4	
A	MEMOREX	1- 10	7	- 1/4	-1.7	
C	MICRODATA CORP	2- 6	5	- 1/2	-9.0	
A	MODULAR COMPUTER SYS	1- 19	11 3/4	- 1/4	-2.0	
N	NCR	15- 39	25 3/4	-1	-3.7	
O	PRIME COMPUTER INC	2- 6	4 1/4	- 1/4	-5.0	
N	PERKIN-ELMER	16- 30	21 1/8	- 7/8	-3.6	
N	PAYTHEON CO	26- 59	48 3/4	-4 1/2	-8.4	
N	SINGER COMPANY	10- 17	11 3/4	- 3/4	-6.0	
N	SPERRY RAND	26- 49	35 3/4	-1 1/2	-4.0	
A	SYSTEMS ENG. LABS	1- 5	3 1/8	0	0.0	
A	ULTIMATE SYSTEMS INC	1- 6	2 5/8	0	0.0	
N	WANG LABORATORIES	15- 38	12 7/8	- 5/8	-4.6	
N	WANG LABS.	7- 17	9 3/8	-2 1/4	-18.4	
N	XEROX CORP	51- 86	53	- 3/4	-1.4	

LEASING COMPANIES

E		PRICE			WEEK	WEEK
N		1975	CLOSE	WEEK	%	%
C		RANGE	SEP 17	NET	CHGE	CHGE
H		113	1975	CHGE		
C	CONDISCO INC	1- 5	3 3/8	+ 1/8	+3.8	
A	COMMERCE GROUP CORP	2- 6	2 5/8	- 3/8	-12.5	
A	COMPUTER INVSTRS GRP	2- 7	3 1/2	+ 1/4	+7.6	
C	DATRONIC RENTAL	1- 1	1/2	0	0.0	
A	DSL INC	1- 1	1/2	0	0.0	
A	DSL	1- 3	1 1/2	0	0.0	
O	FOR RESOURCES	1- 2	1	- 1/8	-7.1	
A	GRAHAM MGT	2- 3	2 1/2	0	0.0	
A	GREYHOUND COMPUTER	2- 3	2 1/2	- 1/8	-15.0	
A	ITEL	3- 9	3	- 1/4	-4.3	
M	LEASCO CORP	4- 8	5 1/2	0	0.0	
O	LEASPAC CORP	1- 2	1 1/4	0	0.0	
C	LECTRO PDT INC	1- 1	1/8	0	0.0	
A	MNC INC	1- 3	1 5/8	- 3/4	-31.5	
A	PREMIER TSK CORP	2- 7	5	+ 1/4	+5.2	
A	ROCKWOOD COMPUTER	1- 1	1/4	0	0.0	
N	U.S. LEASING	7- 14	7	- 1/2	-6.6	

EXCHG: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; +=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID ELI TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

E		PRICE			WEEK	WEEK
N		1975	CLOSE	WEEK	%	%
C		RANGE	SEP 17	NET	CHGE	CHGE
H		113	1975	CHGE		
F	ADVANCED COMP TELI	1- 1	1	+ 1/8	+14.2	
A	APPLIED DATA RES.	1- 10	5 1/8	- 1/8	-7.1	
N	AUTOMATIC DATA PROC.	29- 65	45 3/4	-1 3/4	-11.1	
A	BRANDON APPLIED SYST	1- 2	1	0	0.0	
C	CENTRAL DATA SYSTEMS	3- 7	6 5/8	0	0.0	
A	COMPUTER DIMENSIONS	2- 6	3 3/4	+ 1/4	+7.1	
C	COMP ELECTION SYSTMS	3- 8	5 1/4	- 1/4	-4.5	
C	COMPUTER HORIZONS	1- 1	3/4	0	0.0	
C	COMPUTER NETWORK	1- 3	2 5/8	+ 1/4	+10.5	
C	COMPUTER SCIENCES	2- 6	5	- 1/8	-2.4	
C	COMPUTER TASK GROUP	1- 1	5/8	0	0.0	
C	COMSHARE INC	1- 3	1	- 1/8	-5.8	
C	CYMA INC	1- 1	1/2	0	0.0	
C	DATA 100	1- 3	1 3/8	- 1/4	-15.3	
A	DATEC COMP PROG	1- 1	1/2	0	0.0	
N	ELECTRONIC DATA SYS.	12- 29	15 1/2	3	0.3	
C	INTERACTIVE DATA	1- 1	1/2	0	0.0	
C	IPS COMPUTER MARKET.	1- 1	5/8	- 1/8	-16.6	
A	KEANE ASSOCIATES	2- 5	2	+ 1/8	+6.6	
C	KLYDATA CORP	2- 3	2 3/8	0	0.0	
C	LOGICON	3- 5	3 1/4	0	0.0	
A	MANAGEMENT DATA	1- 3	1 7/8	0	0.0	
F	NATIONAL CSS INC	8- 14	10 5/8	-1 1/8	-15.0	
C	NATIONAL COMPUTER CO	1- 1	1	0	0.0	
A	ON LINE SYSTEMS INC	8- 17	11	- 3/4	-6.3	
A	PLANNING RESEARCH	2- 5	3 3/4	+ 1/4	+6.2	
C	PROGRAMMING & SYS	1- 1	7/8	0	0.0	
C	RPG/DATA INC	2- 5	3 3/8	0	0.0	
C	REYNOLDS & PENAUL	10- 24	11	- 1/2	-4.3	
C	SCIENTIFIC CONTROLS	1- 3	1	0	0.0	
C	SIMPLICITY COMPUTER	1- 1	1/4	+ 1/4	+26.5	
C	TYMSHARE INC	3- 21	5 1/8	+ 1/8	+2.4	
A	URS SYSTEMS	2- 4	3 3/4	+ 1/4	+3.8	
N	WYLY CORP	2- 4	3	- 1/8	-4.0	

PERIPHERALS & SUBSYSTEMS

E		PRICE			WEEK	WEEK
N		1975	CLOSE	WEEK	%	%
C		RANGE	SEP 17	NET	CHGE	CHGE
H		113	1975	CHGE		
N	ADDRESSOGRAPH-MULT	4- 9	7 5/8	+ 5/8	+8.9	
A	ADVANCED MICRO SYS	1- 7	4 3/4	+ 1/4	+5.5	
A	AMPEX CORP	5- 7	4 7/8	- 3/8	-7.1	
A	ARCHIVE (ACORD)	1- 3	1 3/4	- 1/4	-12.2	
F	BENDIX MEDICAL ELEC	1- 5	3 1/8	+ 1/4	+8.6	
A	BOLT BERANEK & NEW	1- 5	3 1/4	+ 1/4	+8.0	
N	BUNKER-RAMO	4- 8	4 3/4	+ 1/4	+5.5	
A	CALCOMP	5- 7	5 3/4	0	0.0	
L	CAMBRIDGE MEMORIES	3- 5	2 3/4	- 3/4	-21.4	
A	CENTRONICS DATA COM	9- 25	14 5/8	+ 5/8	+4.4	
C	CODEX CORP	15- 38	30 3/4	-2 1/4	-6.8	
O	CONTROLONICS	1- 2	3/4	- 1/4	-25.0	
C	COMPUTER COMMUN.	1- 2	1	0	0.0	
C	COMPUTER CONSOLES	1- 3	1 3/4	0	0.0	
A	COMPUTER EQUIPMENT	1- 2	1 3/4	+ 1/8	+7.6	
C	COMPUTER MACHINERY	1- 2	1 1/4	+ 1/8	+10.0	
C	COMPUTER TRANSCEIVER	1- 2	1 1/4	0	0.0	
O	CPT	1- 2	1	- 1/8	-14.2	
A	COMPAC CORP	12- 23	15 3/4	- 1 3/4	-10.0	
O	DATA ACCESS SYSTEMS	1- 3	2	-	0.0	
A	DATA 100	5- 16	8 5/8	- 3/4	+8.0	
A	DATA PRODUCTS CORP	2- 6	3 1/4	+ 3/8	-10.3	
A	DATUM TECHNOLOGY	1- 1	1 1/2	0	0.0	
O	DECISION DATA COMPUT	4- 7	4 1/2	- 1/8	-2.7	
A	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0	
O	DIVAN CONTROLS	1- 1	3/4	0	0.0	
A	ELECTRONIC M & W	5- 11	5 7/8	+ 1/4	+4.4	
O	FABRI-TEK	1- 1	7/8	- 1/8	-12.5	
C	GENERAL COMPUTER SYS	1- 3	1	- 1/8	-11.1	
N	HAZELTINE CORP	3- 6	4 1/8	- 1/4	+6.4	
N	HARRIS CORP	18- 28	20 3/4	-1 1/4	-7.7	
A	INCOTERM CORP	3- 12	9 1/4	- 3/4	-3.9	
O	INFOMEC INC	2- 6	2 1/2	- 1/8	-4.7	
C	INFORMATION INTL INC	8- 14	10 7/8	+1 1/8	+11.5	
A	LUNDY ELECTRNICS	2- 3	2 7/8	0	0.0	
A	MANAGEMENT ASSIST	1- 1	1/2	0	0.0	
A	MILGO ELECTRONICS	8- 24	15 3/4	- 3/4	-2.3	
A	MOHAWK DATA SCI.	1- 3	1	- 1/8	-11.1	
C	OPTICAL SCANNING	1- 3	3	0	0.0	
A	PENN ELECTRON	2- 3	1 1/8	- 1/8	-10.0	
O	PEPTEC CORP	2- 8	4 1/2	- 3/4	+16.2	
A	POTTER INSTRUMENT	2- 4	3 1/4	0	0.0	
C	PRECISION INST.	1- 1	3/4	0	0.0	
A	QUANTUM SCIENCE	3- 6	5	- 1/2	-9.0	
A	RECOGNITION EQUIP	2- 5	3 1/4	- 1/4	+12.5	
A	SANDERS ASSOCIATES	3- 11	5 1/4	-1 1/4	-19.0	
A	STORAGE TECH	2- 4	3 1/4	+ 1/4	+8.0	
O	STORAGE TECHNOLOGY	6- 17	11 1/2	- 3/4	-6.1	
A	SYCOR INC	4- 13	11 3/4	-	-7.4	
O	T BAR INC	3- 6	5 5/8	0	0.0	
O	TALLY CORP.	1- 5	3 1/4	+ 1/8	+4.0	
A	TEC INC	1- 4	3	-	+6.2	
N	TEKTRONIX INC	18- 41	33	-2 1/4	-6.3	
A	TELEX	4- 9	7	+ 1/4	+3.7	
O	WANGCO INC	4- 5	5 5/8	- 3/8	-6.2	
C	WELTEK INC	1- 4	2 1/2	0	0.0	

SUPPLIES & ACCESSORIES

E		PRICE			WEEK	WEEK
N		1975	CLOSE	WEEK	%	%
C		RANGE	SEP 17	NET	CHGE	CHGE
H		113	1975	CHGE		
C	BALTIMORE BUS FORMS	4- 5	4 3/4	0	0.0	
A	BARRY WRIGHT	1- 3	1 3/4	- 1/4	-12.2	
C	CYBERNETICS INC	1- 1	1/2	0	0.0	
A	DATA RECOGNITION	29- 42	32 1/2	- 1/4	-0.7	
C	DUPLEX PRODUCTS INC	12- 25	16	- 1/8	-0.7	
N	ENNIS BUS. FORMS	5- 7	5	- 3/8	-6.9	
O	GRAHAM MAGNETICS	5- 10	8 1/4	- 1/4	-2.9	
A	GRAPHIC CONTROLS	20- 24	11 3/4	- 1/4	-2.1	
A	IM COMPANY	43- 68	49 5/8	-3 5/8	-6.8	
C	MOORE CORP LTD	39- 51	43 1/4	-1	-2.2	
N	NASHUA CORP	11- 22	11 1/8	- 5/8	-5.3	
A	STANDARD REGISTER	13- 20	15 1/2	- 1/4	-1.6	
O	TAB PRODUCTS CO	7- 8	8	0	0.0	
O	VARCO	4- 6	4 1/2	- 1/4	-5.5	
C	VANIER GRAPHICS CORP	4- 7	4 1/2	- 1/4	+5.8	
A	VERSATRONEX	1- 2	1	- 1/4	-20.0	
N	WALLACE BUS FORMS	13- 25	16 1/8	- 3/8	-2.3	

GENERAL LEDGER-1976

NOW AVAILABLE AT

THE FINANCIAL SOFTWARE COMPANY

The 295 users of the MSA General Ledger/Financial Information and Control System are soon to receive the 1976 Edition of the System, complete with these new features: Data Base Independence; On-Line Data Entry and Inquiry; a "Task Manager" for operations simplification; Data Base Security Protection; and a Single Pass Report Writer (Custom Reporting II).

This updated Edition of the leading General Ledger Software System is available to you now. Of all its features, perhaps the best is the fact that once it's installed, you'll never again have to worry about conversion, because MSA keeps you up to date over the years with continuing enhancements.

Please send information on GENERAL LEDGER – 1976

Name_____

Company_____

Address_____

City_____ State_____ Zip_____

Send to: Dennis Vohs, Vice President
Management Science America, Inc.
3445 Peachtree Road, N.E.
Suite 1300
Atlanta, Georgia 30326

During 1974 and 1975, we've invested over $850,000.00 in supporting this System. Send now for the 1976 descriptive manual at no cost or obligation, or call Dennis Vohs, Vice President, MSA, at Area Code 404, 262-2376, for more information.